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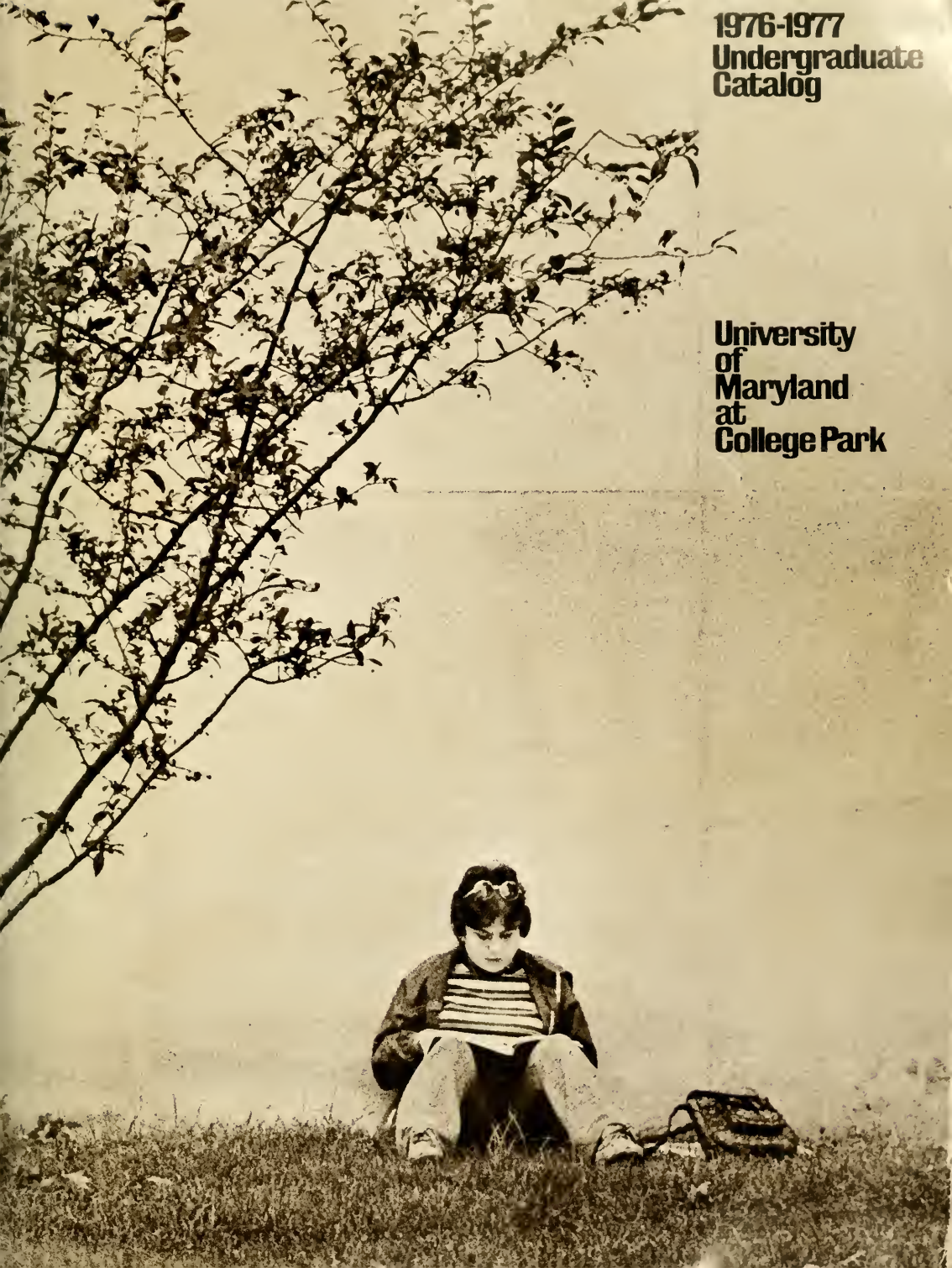
1976-1977 Undergraduate Catalog

University of Maryland at College Park



Undergraduate Catalog 1976-1977

University of Maryland at College Park

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Campus and University Officers

College Park Campus Administration

Chancellor
Robert L. Gluckstern

Vice Chancellor for Academic Affairs
George H. Callcott

Vice Chancellor for Academic Planning and Policy
Thomas B. Day

Vice Chancellor for Administrative Affairs
John W. Dorsey

Vice Chancellor for Student Affairs
William L. Thomas, Jr.

Central Administration of the University

President
Wilson H. Elkins

Vice President for General Administration
Donald W. O'Connell

Vice President for Academic Affairs
R. Lee Hornbake

Vice President for Graduate Studies and Research
Michael J. Pelczar, Jr.

Vice President for Agricultural Affairs and Legislative Relations
Frank L. Bentz, Jr.

Board of Regents

Chairman B. Herbert Brown	Secretary Samuel H. Hoover, D.D.S.	Assistant Secretary William G. Connelly
Vice Chairman Hugh A. McMullen, Esq.	Treasurer L. Mercer Smith	Assistant Treasurer N. Thomas Whittington, Jr.
Mrs. Mary H. Broadwater	Dr. Louis L. Kaplan	John C. Scarbath
Young D. Hance, ex *officio*	Peter F. O'Malley, Esq.	Joseph D. Tydings, Esq.
Edward V. Hurley	Miss Judith Sachwald	

Special Announcement

The General University Requirements. The Board of Regents has approved a major revision of the undergraduate requirements. What has been known as "General Education Requirements," referred to in academic programs in previous editions of this Catalog, is henceforth replaced by "General University Requirements."

Any student who entered the University prior to August, 1973, has the option of completing either the General Education Requirements or the General University Requirements. Students first entering the University in August, 1973, or after must comply with the new General University Requirements.

The University 1

1976-77 Academic Calendar

Summer Session, 1976

Session I		
May 24	Monday	Registration
May 25	Tuesday	Classes begin
May 31	Monday	Holiday, Memorial Day
July 2	Friday	Term ends
Session II		
July 5	Monday	Holiday, Independence Day
July 6	Tuesday	Registration
July 7	Wednesday	Classes begin
August 13	Friday	Term ends

Fall Semester, 1976

August 23, 24	Monday-Tuesday	Registration
August 25	Wednesday	Classes begin
August 30-September 8	Monday-Wednesday	Late Registration
September 6	Monday	Holiday, Labor Day
September 8	Wednesday	End of Schedule Adjustment Period
November 2	Tuesday	Last day to drop a course
November 25-28	Thursday-Sunday	Thanksgiving Recess
December 8	Wednesday	Last day of classes
December 9	Thursday	Exam study day
December 10-17	Friday-Friday	Final exam period
December 17	Friday	Commencement, 2:00 p.m.

Spring Semester, 1977

January 10, 11	Monday-Tuesday	Registration
January 12	Wednesday	Classes begin
January 17-25	Monday-Tuesday	Late Registration
January 25	Tuesday	End of Schedule Adjustment Period
March 21-27	Monday-Sunday	Spring Recess
March 29	Tuesday	Last day to drop a course
May 4	Wednesday	Last day of classes
May 5	Thursday	Exam study day
May 6-13	Friday-Friday	Final exam period
May 14	Saturday	Commencement, 10:00 a.m.

University of Maryland Undergraduate Programs of Study

Programs within the Division of Agricultural and Life Sciences

- Agricultural and Extension Education
- Agricultural and Resource Economics
- Agricultural Engineering
- Agronomy
- Animal Science
- Biochemistry
- Conservation and Resource Development
- Dairy Science
- General Agriculture
- General Biological Sciences
- Horticulture
- Institute of Applied Agriculture
- Poultry Science
- Veterinary Science
- Botany
- Chemistry
- Entomology
- Geology
- Microbiology
- Zoology

Programs within the Division of Arts and Humanities

- Architecture
- Journalism
- American Studies
- Art
- Classical Languages
- Dance
- English
- French and Italian
- German and Slavic
- History
- Music
- Oriental and Hebrew
- Philosophy
- Spanish and Portuguese
- Speech and Dramatic Art
- Russian Area Studies

Programs within the Division of Behavioral and Social Sciences

- Afro-American Studies
- Anthropology
- Bureau of Business and Economic Research
- Bureau of Governmental Research
- Business and Management
- Business/Law
- Economics
- Geography
- Government and Politics
- Hearing and Speech Sciences
- Information Systems Management
- Institute for Urban Studies
- Institute of Criminal Justice and Criminology
- Linguistics
- Psychology
- Sociology

Programs within the Division of Human and Community Resources

- Administration, Supervision and Curriculum
- Counseling and Personnel Services
- Early Childhood-Elementary Education
- Industrial Education
- Institute for Child Study
- Measurement and Statistics
- Secondary Education
- Special Education
- Family and Community Development
- Foods, Nutrition and Institution Administration
- Housing and Applied Design
- Textiles and Consumer Economics
- Library and Information Services
- Health Education
- Physical Education
- Recreation

Programs within the Division of Mathematical and Physical Sciences and Engineering

- Center for Materials Research
- Computer Science
- Fluid Dynamics & Applied Mathematics
- Meteorology
- Molecular Physics
- Mathematics
- Physics and Astronomy
- Physical Sciences
- Aero-Space Engineering
- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Fire Protection
- Mechanical Engineering
- Engineering Technology

Programs within the Office of the Dean for Undergraduate Studies

- Arts/Dentistry
- Arts/Law
- Arts/Medicine
- General Honors
- General Studies
- Individual Studies

Other Pre-Professional Programs

- Pre-Nursing
- Pre-Pharmacy
- Pre-Medical Technology
- Pre-Medicine
- Pre-Optometry
- Pre-Radiological Technology
- Pre-Physical Therapy
- Pre-Dental Hygiene
- Pre-Forestry
- Pre-Law
- Pre-Veterinary Medicine
- Pre-Theology

University Policy Statement

The provisions of this publication are not to be regarded as an irrevocable contract between the student and the University of Maryland. Changes are effected from time to time in the general regulations and in the academic requirements. There are established procedures for making changes, procedures which protect the institution's integrity and the individual student's interest and welfare. A curriculum or graduation requirement, when altered, is not made retroactive unless the alteration is to the student's advantage and can be accommodated within the span of years normally required for graduation. When the actions of a student are judged by competent authority, using established procedure, to be detrimental to the interests of the University community, that person may be required to withdraw from the University.

The University of Maryland, in all its branches and divisions, subscribes to a policy of equal educational and employment opportunity for people of every race, creed, ethnic origin, and sex.

It is University policy that smoking in classrooms is prohibited unless all participants agree to the contrary. Any student has the right to remind the instructor of this policy throughout the duration of the class.

Important Information on Fees and Expenses

All Students Who Pre-Register Incur a Financial Obligation to the University. Those students who pre-register and subsequently decide not to attend must notify the Registrations Office, Room 1130A, North Administration Building, in writing, prior to the first day of classes. If this office has not received a request for cancellation by 4:30 p.m. of the last day before classes begin, the University will assume the student plans to attend and accepts his or her financial obligation.

After classes begin, students who wish to terminate their registration must follow the withdrawal procedures and are liable for charges applicable at the time of withdrawal.

Disclosure of Information. In accordance with "The Family Educational Rights and Privacy Act of 1974" (P.L. 93-380), popularly referred to as the "Buckley Amendment," disclosure of student information, including financial and academic, is restricted. Release to anyone other than the student requires a written waiver from the student. (For complete University Policy on access to and release of student data/information, see page 35.

State of Maryland legislation has established a State Central Collections Unit and in accordance with State law the University is required to turn over all delinquent accounts to them for collection and legal follow-up. These are automatically done on a monthly basis by computer read-out.

Collection Costs. Collection costs incurred in collecting delinquent accounts will be charged to the student. The normal collection fee is 15%, plus any attorney and/or court costs.

Title IX Compliance Policy

The University of Maryland at College Park does not discriminate on the basis of sex in its educational programs and activities. The policy of non-discrimination extends to employment in the institution and academic admission to the institution. Such discrimination is prohibited by Title IX of the Education Amendments of 1972 (20 U.S.C. 1681, et seq.) and 45 C.F.R. 86, and this notification is required under the Federal regulations pursuant to 20 U.S.C. 1681 et seq.

Inquiries concerning the application of Title IX and Part 86 of 45 C.F.R. to the University of Maryland, College Park, may be directed to the Office of Human Relations Programs, Main Administration Building, University of Maryland, College Park; or to the Director of the Office of Civil Rights of the Department of Health, Education and Welfare, Washington, D.C.

Gender Reference

The masculine gender whenever used in this document is intended to include the feminine gender as well.

Academic Information

Prospectus

College Park publishes a free booklet, **Maryland,** for prospective undergraduate students. For a copy of this booklet, call 301/454-3924 or write to: Catalog Mailing, 4910 Calvert Road, College Park, Maryland 20742.

Departmental Brochures

Small brochures are available free from the Admissions Office of many of the departments at College Park. Write to Admissions, University of Maryland, College Park, Maryland 20742.

Undergraduate Catalog

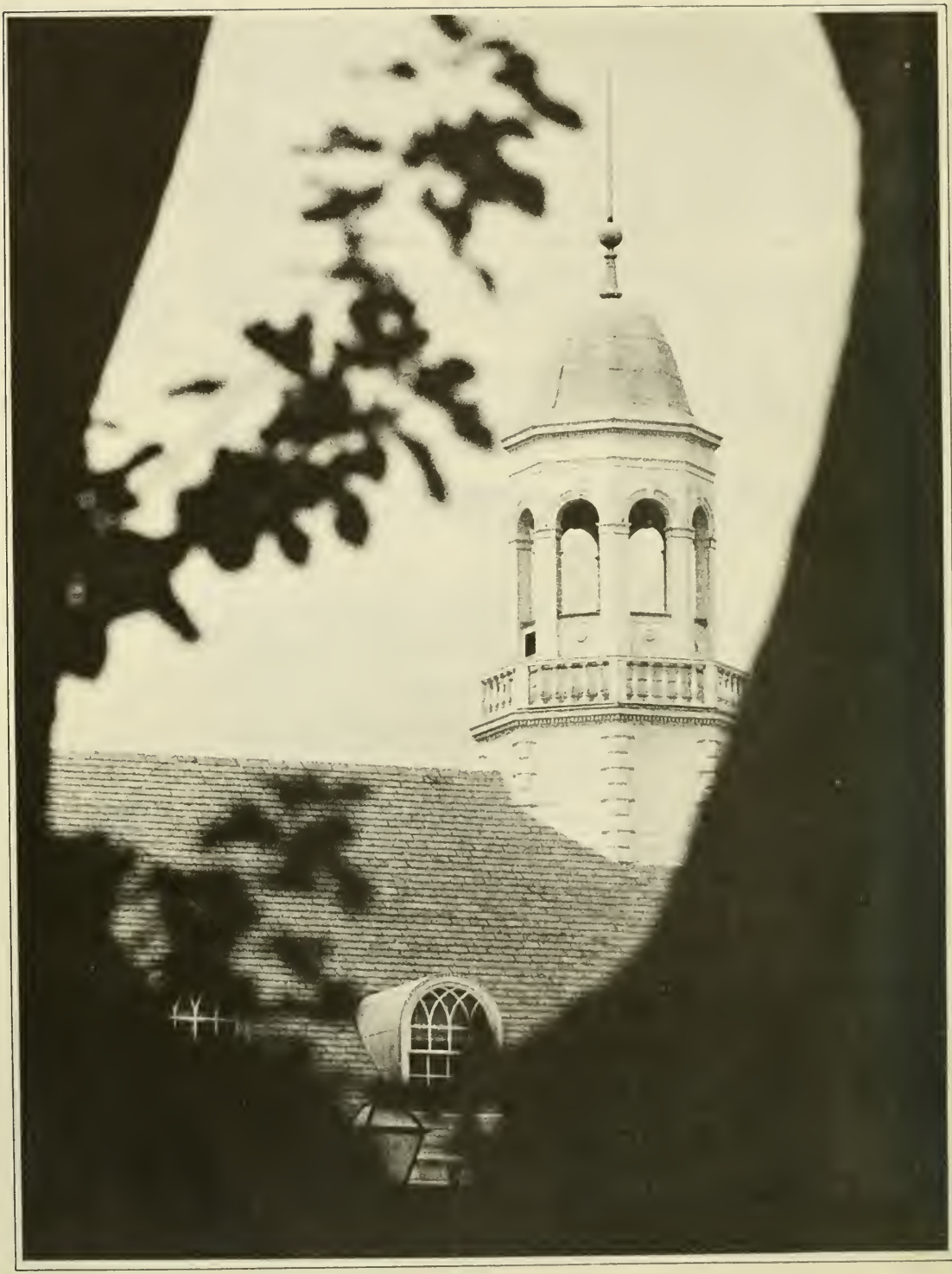
The **Undergraduate Catalog** is available free to all undergraduates and to all faculty at College Park before each academic year. Copies are available in libraries and in high schools in Maryland, D.C. and Virginia. Copies are for sale for $2.00 each. Send a check payable to the 'University of Maryland,' to the UMporium, College Park, Maryland 20742. Write 'Catalog' on the check. Allow four weeks for delivery.

Graduate Catalog, Graduate Bulletin

For information about the **Graduate Catalog** or the **Graduate Bulletin,** call 301/454-3141 or write the Graduate Offices, South Administration Building, College Park, Maryland 20742.

Summer Sessions Catalog

For information call 454-3347 or write to: Summer Sessions Offices, Turner Lab, College Park, Maryland 20742.



General Information 2

The University

Goals For College Park

Our objectives are simply stated: to enrich our students; to encourage them to develop the harmonious ideals and fine relationships which characterize cultured individuals, to provide an atmosphere for self-enlightenment; and to promote beneficial research for the welfare of the State, of the nation, and of the community of knowledge everywhere.

Universities in General

The contemporary university is a comprehensive educational institution offering many undergraduate programs.

Universities as we know them in the United States have existed for less than a century, but their roots can be traced back to medieval history. The English college system served as the model for earliest American efforts at higher education. The ancient German university tradition was joined with this in the 1870's to form basic outlines of our present institutions. Practical studies were grafted onto these more classically and theoretically oriented traditions by the agricultural emphasis of the land grant movement.

With the explosion of scientific and technological knowledge in the early twentieth century, the role of the university in American society attained increased importance, and today almost all aspects of national life—social, economic, scientific, and cultural—benefit from its educational, research and service functions.

College Park and the University of Maryland

The College Park Campus of the University of Maryland was opened in 1859 as the Maryland Agricultural College under a charter secured by a group of Maryland planters. After a disastrous fire in 1912, the State acquired control of the college and bore the cost of rebuilding. In 1920 the State took over the faculty-owned University of Baltimore founded in 1807, merging it with the State-owned institution at College Park to form the present-day University of Maryland.

In 1886 the Delaware Conference Academy was founded by the Methodist Church in Princess Anne, Maryland. Title to the institution was acquired by the State of Maryland in 1926, and it became a division of the University of Maryland in 1948. It was made an integral part of the University system with the name, University of Maryland Eastern Shore (UMES) in 1970.

A third campus, the University of Maryland Baltimore County (UMBC) was opened at Catonsville in 1966.

Another administrative unit of the University is University College (UMUC) which offers degree and non-degree educational programs held usually in the late afternoon, evening, or on weekends both at College Park, and elsewhere in the state, nation, and abroad. Administratively and academically UMUC is an integral part of the University, but its course offerings are not included in the programs of the College Park Campus.

Libraries at College Park

The Theodore R. McKeldin Library is the general library of the University, containing reference works, periodicals, circulating books, and other materials in all fields of research and instruction. Branch libraries include the Undergraduate Library, the Engineering and Physical Sciences Library, the Architecture Library, and the Chemistry Library.

The libraries on the College Park Campus include approximately 1,450,000 volumes, nearly 900,000 microfilm units, and approximately 11,000 subscriptions to periodicals and newspapers, as well as many government documents, phonorecords, films, slides, prints, and music scores.

The Undergraduate Library, opened in 1973, seats 4,000 students and has a book capacity of 200,000 volumes. It features a recreational reading collection of 5,000 paperbacks, a quadrophonic concert room, color video tape players and playback units, enclosed rooms equipped with instructor's consoles for the use of nonprint media materials, and wireless stereo headsets for tapes and lectures, plays, speeches, and music. The McKeldin Library mainly supports the graduate and research programs of the University, but is also open to undergraduates.

Special collections in the library system include those of Richard Van Mises in mathematics and applied mechanics; Max Born in the physical sciences; Thomas I. Cook in political science; Romeo Mansueti in the biological sciences; Katherine Anne Porter; Maryland; U.S. government publications (for which the University is a regional depository); documents of the United Nations, the League of Nations, and other international organizations; agricultural experiment station and extension service publications; maps from the U.S. Army Map Service; the files of the Industrial Union of Marine and Shipbuilding Workers of America; the Wallenstein collection of musical scores; the Andre Kostelanetz Music Library; and research collections of the American Bandmasters Association, the National Association of Wind and Percussion Instructors and the Music Educators National Conference. In addition, the collections include microfilm productions of government documents, rare books, early journals, and newspapers.

Other Area Resources

The College Park Campus area is in a region rich in research collections. In the Washington area are the Library of Congress, the National Archives, the Folger Library, the National Library of Medicine, the National Agricultural Library, and various academic and special libraries. In the Baltimore area, in addition to the University's own libraries at UMBC and on the professional campus, are the Enoch Pratt Free Library and the Maryland Historical Association Library. The Maryland Hall of Records is located in Annapolis.

Campus Research Facilities

The research programs at the University derive their existence and vigor from a faculty comprised of internationally recognized scholars and scientists. It is an advantage for undergraduate students to be aware of the University's research facilities as they plan their programs.

Among the exceptional research facilities are: a 140 MeV cyclotron; a nuclear reactor; scanning electron microscopes; subsonic and hypersonic wind tunnels; an electron ring accelerator; a precision encoder and pattern recognition device; a gravitational radiation detection system including a gravimeter on the moon; a quiescent plasma device (Q machine); a psycho-pharmacology laboratory; three retro-reflector arrays on the moon; rotating tanks for laboratory studies of meteorological phenomena; Van de Graaff accelerators; a laboratory for basic behavioral research; an assortment of computers; and the Astronomy Observatory.

The College Park Campus also owns and operates one of the largest and most sophisticated long-wavelength radio telescopes (located in Clark Lake, Calif.) and a cosmic ray laboratory (located in New Mexico).

In addition to these research opportunities in the biological, mathematical and physical sciences, research programs in the behavioral sciences, social sciences and education exist in many bureaus and institutes including: the Bureau of Business and Economic Research, Bureau of Educational Research and Field Services, Bureau of Governmental Research, Institute for Child Study, Institute of Criminal Justice and Criminology, and the Institute for Urban Studies.

Investigation in agriculture is an important aspect of University research. University farms total more than 2,000 acres. Breeding, selection in farm crops, and soil research are a part of the program. Work in these areas is augmented by X-ray equipment and an electron microscope.

Summer Sessions

The College Park Campus offers two summer sessions of six weeks each during 1976. The first session begins May 24 and ends July 2. The second session runs from July 6 to August 13. New freshmen applicants who have met the regular University admission requirements for fall enrollment may begin their studies during the summer rather than await the next fall term. By taking advantage of this opportunity and continuing to attend summer sessions the time required for completion of a baccalaureate degree can be shortened by a year or more, depending upon the requirements of the chosen curriculum and the rate of progress.

Many new students have found that attendance during the summer sessions facilitates the transition from secondary school to college. Courses offered during the summer are the same in content and instruction as those offered during the fall and spring semesters.

The Summer Cultural and Recreational Program is an important part of "Summer at Maryland." A Fine Arts Festival offers a series of programs in art, dance, drama, film, and music, and outstanding performers in these media appear on the College Park Campus. Facilities for most sports and an intramural program in several team and individual sports are available to the students.

For additional information write for a *Summer Sessions Catalog*, which may be obtained from the Administrative Dean for Summer Programs, College Park, Md. 20742.

Accreditation

The University of Maryland is accredited by the Middle States Association of Colleges and Secondary Schools and is a member of the Association of American Universities. In addition, individual schools and departments are accredited by such groups as the American Association of Collegiate Schools of Business, the American Chemical Society, the National Association of Schools of Music, the Section of Legal Education and Admissions to the Bar of the American Bar Association, the American Council of Education for Journalism, the American Council on Pharmaceutical Education, the Council on Dental Education of the American Dental Association, the Committee on Accreditation of the American Library Association, the American Psychological Association, the Commission on Accreditation of the Council on Social Work Education, the Council on Medical Education of the American Medical Association, the Engineers' Council for Professional Development, the National Council for Accreditation of Teacher Education, the National League for Nursing, the National Architectural Accrediting Board, the American Association for Accreditation of Laboratory Animal Care, and the American Dietetic Association.

Admission and Orientation

Undergraduate Admission

The University of Maryland, in all its branches and divisions, subscribes to a policy of equal educational and employment opportunity for people of every race, creed, ethnic origin, and sex.

Admissions Requirements

The University of Maryland is a publicly-supported land grant institution dedicated primarily to the educational needs of Maryland residents. Within its responsibilities as a State facility, the University attracts a cosmopolitan student body, and each year offers admission to a number of promising men and women from other states and jurisdictions. All of the 50 states and 93 foreign nations are currently represented in the undergraduate population.

5400 new freshmen entered the College Park Campus of the University of Maryland in fall 1974. The typical freshman had a Verbal SAT score of 47 and Math SAT score of 51.

Freshmen — Maryland Residents. In order to be admitted, freshmen applicants who are Maryland residents must meet **ONE** of the following **THREE** criteria for admission: **FIRST:** Have a C average in academic subjects in the 10th and 11th grades and rank in the top half of the high school graduation class, **OR, SECOND:** Satisfy the requirements outlined in the chart below. The chart indicates the combination of academic grade point average and total SAT scores required to be eligible for admission.

If the applicant has taken the SAT several times, the University will use the highest set of scores for a single test date.

To determine your eligibility for admission based on the chart below:

1. Calculate your academic grade point average in the 10th and 11th grades. A list of the courses which the College Park Campus uses in computing the high school academic grade point average is provided below.
2. Locate the line on the chart which indicates your highest total SAT scores for a single test date. For example, if you took the Scholastic Aptitude Test twice and earned the following scores:

1st test date	Verbal 50
	Math 51
2nd test date	Verbal 53
	Math 50

   you would use the test scores for the second test date.
3. If your academic grade point average is equal to or higher than the grade point average listed on the chart beside your highest total SAT score, you will be admitted to the College Park Campus.

Minimum Requirements for Maryland Freshmen Applicants Using Total SAT Scores and Academic Grade Point Average as Criteria

Total SAT Score	Academic Grade Point Average	Total SAT Score	Academic Grade Point Average
40	2.48	100	1.73
41	2.47	101	1.72
42	2.45	102	1.71
43	2.44	103	1.69
44	2.43	104	1.68
45	2.42	105	1.67
46	2.40	106	1.66
47	2.39	107	1.64
48	2.38	108	1.63
49	2.37	109	1.62
50	2.35	110	1.61
51	2.34	111	1.59
52	2.33	112	1.58
53	2.32	113	1.57
54	2.30	114	1.56
55	2.29	115	1.54
56	2.28	116	1.53
57	2.27	117	1.52
58	2.25	118	1.51
59	2.24	119	1.49
60	2.23	120	1.48
61	2.22	121	1.47
62	2.20	122	1.46
63	2.19	123	1.44
64	2.18	124	1.43
65	2.17	125	1.42
66	2.15	126	1.41
67	2.14	127	1.39
68	2.13	128	1.38
69	2.12	129	1.37
70	2.10	130	1.36
71	2.09	131	1.34
72	2.08	132	1.33
73	2.07	133	1.32
74	2.05	134	1.31
75	2.04	135	1.29
76	2.03	136	1.28
77	2.02	137	1.27
78	2.01	138	1.26
79	1.99	139	1.24
80	1.98	140	1.23
81	1.97	141	1.22
82	1.96	142	1.21
83	1.94	143	1.20
84	1.93	144	1.18
85	1.92	145	1.17
86	1.91	146	1.16
87	1.89	147	1.15
88	1.88	148	1.13
89	1.87	149	1.12
90	1.86	150	1.11
91	1.84	151	1.10
92	1.83	152	1.08
93	1.82	153	1.07
94	1.81	154	1.06
95	1.79	155	1.05
96	1.78	156	1.03
97	1.77	157	1.02
98	1.76	158	1.01
99	1.74	159	1.00

OR, THIRD: Satisfy the requirements outlined in the chart below. The chart indicates the combination of academic grade point average and high school class rank required to be eligible for admission.

To determine your eligibility for admission based on the chart below:

1. Calculate your academic grade point average in the 10th and 11th grades. A list of the courses which the College Park Campus utilizes in computing the academic grade point average is provided below.
2. Compute your class rank. Class rank is expressed as a percentile in the chart. To determine your percentile, divide the number of students in your graduating class into your class rank and subtract the result from 100. For example, a student who ranks 80 in a class of 110 would rank at the 28th percentile (110 divided into 80 equals 72, 100 less 72 equals 28th percentile).
3. Locate the line on the chart which indicates your class rank percentile.
4. If your academic grade point average is equal to or higher than the grade point average listed on the chart beside your class rank percentile, you will be admitted to the College Park Campus.

Minimum Requirements for Maryland Freshmen Applicants Using High School Class Rank and Academic Grade Point Average as Criteria

Class Rank Percentile	Academic Grade Point Average	Class Rank Percentile	Academic Grade Point Average
1	2.58	31	2.28
2	2.57	32	2.27
3	2.56	33	2.26
4	2.55	34	2.25
5	2.54	35	2.24
6	2.53	36	2.23
7	2.52	37	2.22
8	2.51	38	2.21
9	2.50	39	2.20
10	2.49	40	2.19
11	2.48	41	2.18
12	2.47	42	2.17
13	2.46	43	2.16
14	2.45	44	2.15
15	2.44	45	2.14
16	2.43	46	2.13
17	2.42	47	2.12
18	2.41	48	2.11
19	2.40	49	2.10
20	2.39	50	2.09
21	2.38	51	2.08
22	2.37	52	2.07
23	2.36	53	2.06
24	2.35	54	2.05
25	2.34	55	2.04
26	2.33	56	2.03
27	2.32	57	2.02
28	2.31	58	2.01
29	2.30	59	2.00
30	2.29	60	1.99

Use of Mid-Year Grades. The University will reserve a decision on the applications of Maryland residents who do not meet the criteria outlined above until mid-year grades are available for the senior year in high school. The College Park Campus is unable to utilize the final high school marks in rendering decisions for applicants who are applying for admission directly from high school.

If your mid-year grades for the senior year in high school are available when your application is initially considered by the College Park admissions staff, they will be used in determining your eligibility for admission.

Subjects Used for Computation of the High School Academic Grade Point Average. Because of variations in course titles in the secondary school systems, this listing is not inclusive. It does, however, provide you with examples of the types of courses the College Park Campus utilizes in computing the high school academic grade point average.

English. Composition, Communications, Creative Writing, Conversational Language, Debate, Expressive Writing, Journalism, Language Arts, Literature, Public Speaking, Speech, World Literature.

Foreign Languages. French, German, Greek, Hebrew, Italian, Latin, Russian, Spanish, Other.

Mathematics. Advanced Topics, Algebra I, Algebra II, Analysis (or Elementary Analysis), Analytic Geometry, Calculus, Computer Math, Functions, Geometry, Mathematics II, Mathematics III, Mathematics IV, Matrices Probabilities, Modern Geometry, Probability and Statistics, E.A.M. (Rev. Acad. Math), S.M.S.G., Modern Math, Trigonometry.

Science. Advanced Biology, Advanced Chemistry, Biology, Chemistry, Earth Science, General Science, Genetics, Geology, Laboratory Science, Physical Science, Physics, Space Science, Zoology.

Social Studies. Afro-American Studies, American History, Ancient History, Anthropology, Child Development, Civics-Citizenship, Contemporary Issues (C.I.S.S.), Cultural Areas, Cultural Heritage, Economics, Economic Citizenship, Ethics (if considered to be Religion, not counted), European History, European History and Survey, Family Living, Far East, Pan American, Geography, Government, Humanities, International Affairs, Medieval History, Modern History, Modern Problems, National Government, Philosophy, Political Science, Problems of Democracy, Problems of 20th Century, Psychology, Sociology, State History, U.S. History, World Civilization, World Cultures.

Other Requirements for Freshmen Applicants. The University requires freshmen to earn a high school diploma or satisfy early admission requirements prior to their first registration at the College Park Campus.

The SAT examination is required of all freshmen applicants. Test results must be submitted *directly* to the College Park Campus by the Educational Testing Service. You are strongly urged to include your social security number when registering for the SAT. This will expedite processing of your application for admission by the College Park Campus. The reporting code for the College Park Campus is 5814. The university strongly recommends that the SAT be taken as early as possible. The January test is the latest acceptable examination for fall applicants. Further information on the SAT may be obtained from high school guidance offices or directly from the Educational Testing Service, Princeton, New Jersey 08540.

Early Admission. Although the University of Maryland generally requires applicants to earn a high school diploma prior to their first registration, the College Park Campus will admit well-qualified students without this document provided:

1. they have a minimum B (3.0) average in academic subjects.
2. the student is within four semester courses (two credits) of high school graduation.
3. the student has the endorsement of the high school and the superintendent of schools, when appropriate.

School of Architecture. Admission to the School of Architecture is competitive with selection based on previous academic achievement.

All Architecture applicants must file an application by March 1 to be assured of consideration. Because of severe space limitations, an early application is strongly encouraged.

Applications for the School of Architecture are accepted for the fall semester only.

Special Situations. The above admissions criteria have been developed primarily for the applicant who has recently been graduated from high school. The University recognizes that the above criteria may not be entirely relevant for applicants from the State of Maryland who have had military experience and/or have worked for two or more years. If this situation applies to you, we call your attention to the following:

High School Equivalence Examination. Maryland residents who are at *least 17 years of age* and have *not* received a high school diploma can be considered for admission by presenting the high school General Education Equivalency certificate. In order to be admitted to the College Park Campus, the applicant must present an average score of 50 with no score below 40 on any of the five parts of the test or a minimum score of 45 on each of the five parts of the test.

Maryland Residents Who Have Graduated from High School. Maryland residents who do not meet the admissions requirements outlined above for freshmen applicants should contact a counselor from the Office of Admissions. The counselor will assist you in evaluating the possibility of admission at College Park and will offer suggestions regarding your plans to attend college.

Transfer Student Admission

Undergraduate Students Transferring from Outside the University System. A student who has attended any institution of higher learning following graduation from high school and attempted nine or more credits must be considered for admission as a transfer student.

General Statement. The university will use the average stated on the transcript by the sending institution. In cases where there is more than one previous institution, the averages of all institutions attended will be cumulative.

Transfer applicants must be in good academic and disciplinary standing at their previous institutions to be eligible for possible transfer to the College Park Campus.

Those Admissible as High School Seniors. Students who were eligible for admission as high school seniors and who are in good academic and disciplinary standing at their previous institutions are eligible to be considered for transfer. Maryland residents must have a C average in all previous college-level work to be admitted. Non-resident transfers are considered on the basis of competitive criteria.

Those Not Admissible as High School Seniors. Maryland residents who are not admissible as high school seniors must complete at least 28 semester hours with a C or better cumulative average at another institution before applying for transfer admission.

Transfer Students from Maryland Public Community Colleges. Maryland residents who attend Maryland public community colleges regardless of their eligibility for admission directly from high school, will be admitted after they have received the Associate of Arts degree or completed 56 semester hours with a C or better cumulative average. Where the number of students desiring admission exceeds the number that can be accommodated in a particular professional or specialized program, admission will be based on criteria developed by the University to select the best qualified students.

Exception to the 56 hour A.A. degree rule will be made for a student attempting to transfer into a program which is not available at the student's community college in a full two-year program. In order to be admitted to the College Park Campus as an exception to the two-year rule, the applicant must obtain a letter from the transfer advisor at his/her community college recommending that the University waive the two-year requirement in his/her case because of problems with obtaining sufficient major program courses.

School of Architecture. Admission to the School of Architecture in the Division of Arts and Humanities is competitive with selection based on the transfer student's previous academic achievement. All Architecture applicants must file an application by March 1 to be assured of consideration. Because of severe space limitations, an early application is strongly encouraged.

Applications for the School of Architecture are accepted for the fall semester only. Transfer applications for the School of Architecture are not evaluated until the early summer.

Undergraduate Students Transferring from Within the University System. A student seeking to move from one campus of the University to another must have been a regular degree-seeking student eligible to return to his original campus.

Students who were special or non-degree students or students who have been academically dismissed by one campus must contact the admissions office of the receiving campus.

Students must apply within the normal deadlines and, where space is limited, admission to the new campus will be based on criteria designed to select the best qualified students.

The Out-of-State Applicant

The University is very pleased to consider applications from students who are not residents of the State of Maryland. Because the primary obligation of the University is to Maryland residents, however, the number of out-of-state students who can be admitted is limited. The typical freshman applicant presents better than average SAT scores and high school grades. The typical transfer presents better than average credentials in his previous college-level work.

Pre-Professional Programs

The College Park Campus offers *pre*-professional programs in Dental Hygiene, Dentistry, Forestry, Law, Medical Technology, Medicine, Nursing, Osteopathy, Pharmacy, Physical Therapy, Radiologic Technology, Theology, and Veterinary Medicine.

The College Park Campus does *not* offer degrees in these areas. The Campus does, however, offer specific course advisement that will prepare the student for a possible transfer to another branch of the University of Maryland or other institutions that do offer degrees in these fields. *Admission to a pre-professional program on the College Park Campus does not guarantee admission to another branch of the University or another institution.*

Students who have already earned more than 30 semester hours at another college-level institution should contact an academic counselor for the pre-professional programs at College Park *before* registering at the College Park Campus. Please address correspondence to the pre-professional program to which you are applying, University of Maryland, College Park, Maryland 20742.

Non-Degree (Special) Student Admission

Applicants who qualify for admission but do not desire to work toward a baccalaureate degree may be admitted as non-degree seeking (special) students.

Special students who have received a baccalaureate degree are advised that no credit earned while enrolled as special students may be applied at a later date to a graduate program. These post-baccalaureate students may enroll in undergraduate courses for which they possess the necessary prerequisites, but may not enroll in courses restricted to graduate students only.

Non-degree seeking (special) students who do not have a baccalaureate degree or an R.N. must submit transcripts and meet regular admission standards. Transcripts are not required from students with baccalaureate degrees or an R.N.

Because of space limitation, several departments require permission in advance to enroll as a non-degree student. Please contact the Office of Admissions for further information.

Transfer of Credits

Maryland Council for Higher Education Articulation Agreement. The University of Maryland fully ascribes to the Maryland Council for Higher Education Articulation Agreement. The complete text of the agreement follows:

Preamble. The initial over-reaching objective of this committee has been to relate in operational ways the undergraduate programs offered in the public sector of higher education in Maryland including the Community Colleges, the State Colleges, and the campuses of the University.

The intended principal benefactor is the student who is best served by current information about programs and protected by firm arrangements among the public segments of higher education in Maryland which permits him to plan a total degree program from the outset. With successful academic performance, he or she can make uninterrupted progress even though transfer is involved. The measure of the plan is maximum transferability of the college level credits. Essentially, the transfer and native students are to be governed by the same academic rules and regulations. It is recognized that the guidance data essential to the implementation of transfer arrangements go well beyond the scope of the present report.

In a complementary way the State's interests are served by having its higher education resources used optimally by reducing the time taken to complete a degree through the avoidance of repeated class experiences.

The institutional interests are protected also by the systematic approach; they are relieved of the uncertainties of unplanned articulation without becoming production line enterprises.

The dynamics of higher education preclude once-and-for-all time curriculums and perpetual grading and retention systems as cases in point. However, within the general structure of this plan there is opportunity for continual updating of the details.

In more specific ways the Committee has proceeded (1) to recommend specific areas of agreement among the public Community Colleges, the State Colleges, and the State University pertaining to facilitating the transfer of students within the segments of public higher education in the State; (2) to provide for a continuous evaluation and review of programs, policies, procedures, and relationships affecting transfer of students; and (3) to recommend such revisions as are needed to promote the academic success and general well-being of the transfer student.

Policies.

1. Public four-year colleges and campuses of the University shall require attainment of an overall "C" average by Maryland resident transfer students as defined by the sending institutions as one standard for admission. If the student has two or more institutions, the overall "C" (2.0) will be computed on grades received in courses earned at all institutions attended, unless the student presents an Associate in Arts degree.
   (a) Efforts shall be intensified among the sending institutions to counsel students on the basis of their likelihood of success in various programs and at various institutions based on shared information (See par. 1(b) and par. 9)
   (b) Procedures for reporting the progress of students who transfer within the State shall be regularized as one means of improving the counseling of prospective transfer students. In addition, each public institution of higher education shall establish a position of student transfer coordinator to assist in accomplishing the policies and procedures outlined in this plan.
2. Admission requirements and curriculum prerequisites shall be stated explicitly.
   (a) Course and semester hour requirements which students must meet in order to transfer with upper division standing shall be clearly stated.
   (b) The establishment of articulated programs is required in professional and specialized curricula.
   (c) Students shall be strongly encouraged to complete the requirements for the award of an Associate in Arts Degree or to complete successfully 56 semester hours of credit before transfer.
3. Information about transfer students who are capable of honors work or independent study shall be transmitted to the receiving institution.
4. Transfer students from newly established public colleges which are functioning with the approval of the State Department of Education shall be admitted on the same basis as applicants from regionally accredited colleges.
5. (a) Students from Maryland Community Colleges who have been awarded the Associate in Arts degree or who have successfully completed 56 semester hours of credit, in either case in college and university-parallel courses (see par. 6), and

who attained an overall "C" (2.0) average, shall be eligible for transfer. Normally they will transfer without loss of credits and with junior standing provided they have met the requirements and prerequisites established by the receiving institution within the major. Parenthetically, junior standing does not assure graduation within a two-year period of full-time study by a native student or by a transfer student.

(b) The Associate in Arts degree shall serve as the equivalent of the lower division general education requirements at the receiving institution where the total number of credits required in the general education program in the sending institution is equal to or more than that required in the receiving institution and where the credits are distributed among the arts and sciences disciplines.

(c) The determination of the major program requirements for a baccalaureate degree, including courses in the major taken in the lower division, shall be the responsibility of the institution awarding the degree.

6. Credit earned at any public institution shall be transferable to any other public institution as long as that credit was designed specifically for a college or university-parallel program, and providing its acceptance is consistent with the policies of the receiving institution governing native students following the same program. Transfer of credits from terminal (career) programs shall be evaluated by the receiving institution on a course by course basis. Credits applied towards a specific major and minor shall be determined by the receiving institution in these cases.
7. Credit earned in or transferred from a community college shall normally be limited to approximately half the baccalaureate degree program requirement and to the first two years of the undergraduate educational experience.
8. Transfer students shall be given the option of satisfying graduation requirements which were in effect at the receiving institution at the time they enrolled as freshmen at the sending institution, subject to conditions or qualifications which apply to native students.
9. Institutions shall notify each other as soon as possible of impending curriculum changes which may affect transferring students. When a change made by one institution necessitates some type of change at another institution, sufficient lead time shall be provided to effect the change with minimum disruption. The exchange of data concerning such academic matters as grading systems, student profiles, grading profiles, etc., is required.
10. Community college students shall be encouraged to choose as early as possible the institution and program into which they expect to transfer.
11. Innovative programs in all institutions are encouraged. Proposed programs which would have system-wide implications or which would affect student transfers to more than one institution must be reported to the Maryland Council for Higher Education.
12. The Maryland Council for Higher Education Articulation Committee shall continue to review and evaluate current articulation policies and shall set additional policies as needed. In addition, the Maryland Council will publish a brochure periodically listing the prerequisites within the major and professional programs of all public four-year colleges and universities in the State.
13. In the event a transfer student believes he or she has not been accorded the consideration presented in this policy statement, he shall have the opportunity to have the situation explained or reconciled.

    Initially, differences of interpretation regarding the award of transfer credit shall be resolved between the student and the institution to which he is transferring. If a difference remains unresolved, the student shall present his evaluation of the situation to the institution from which he is transferring. Representatives from the two institutions shall then have the opportunity to resolve the differences.

    The sending institution has the right to present an unresolved case to the Committee on Articulation by addressing the Maryland Council for Higher Education. The Committee on Articulation shall, through an appointed subcommittee, receive relevant documentation, opinions, and interpretations in written form from the sending and receiving institution and from the student. Subcommittee deliberations will be confined to this written documentation. The full committee shall act on the subcommittee recommendation.

    Copies of the committee recommendation shall be forwarded to the institutions involved through the Maryland Council for Higher Education. The Council shall then be advised of the institutional action within a ten-day period.

    A complaint on transfer status must be initiated by the student within the first semester of his enrollment in the receiving institution.
14. The State of Maryland should support four-year institutions so that all students in an articulated transfer program who are awarded an Associate in Arts degree from a public community college shall be admitted with full junior standing to a public four-year institution, unless either the number of students desiring admission exceeds the number that can be accommodated in a particular professional or specialized program or certain circumstances exist which require a limitation being placed on the size of junior programs. In such instances, admission will be based on criteria developed by the receiving institution to select the best qualified students.

General Statement. In general, credit from academic courses taken at an accredited institution in areas that can be considered part of the student's University program and in which the student earned a grade of C or better will transfer.

Credits Taken at Community Colleges. Credits earned in or transferred from a community college shall normally be limited to approximately half of the four-year baccalaureate degree requirement. Credits transferred from community colleges are accepted as lower division credits.

Credits Taken at a Maryland Public Community College. Students from Maryland community colleges who have been awarded the Associate in Arts degree or who have successfully completed 56 semester hours of credit, in either case in college and university-parallel courses, and who attained an overall C average shall normally transfer without loss of credits and with junior standing, provided they have met the requirements and prerequisites established by the receiving institution within the major.

Credit earned at any public institution shall be transferable to any other public institution as long as that credit was designed specifically for a college or university-parallel program, and provided its acceptance is consistent with the policies of the University governing native students following the same program.

Transfer of credits from terminal (career) programs shall be evaluated by the receiving institution on a course by course basis provided in the Maryland Council for Higher Education Articulation Agreement.

Foreign Language Credit. Transfer foreign language credit is usually acceptable in meeting requirements. Prospective students should consult the appropriate sections of this catalog to determine the specific requirements of various colleges and curricula.

Credit by Examination

Advanced Placement Program. Students entering the University from secondary schools may obtain advanced placement and college credit on the basis of their

performance on the College Entrance Examination Board Advanced Placement Program examinations. These examinations are normally given to eligible high school seniors during the May preceding matriculation in college.

The University will award advanced placement or college credit for appropriate scores on the following examinations: biology, chemistry, English, French, German, history, Latin, mathematics, physics and Spanish. The College Park Campus specifies that the examinations be taken before first matriculation at a collegiate institution.

Students with specific questions about the University's policy concerning the Advanced Placement Program should contact the office of the Administrative Dean for Undergraduate Studies. Detailed information about the examinations and registration procedures may be obtained from your high school guidance counselor or from the Director of Advanced Placement Program, College Entrance Examination Board, 888 Seventh Avenue, New York, NY 10018.

Other Credit by Examination Options. Students are encouraged to refer to other sections of this catalog for information on additional credit by examination options.

Determination of In-State Status for Admission, Tuition and Charge-Differential Purposes. The Board of Regents of the University of Maryland approved new regulations for the determination of in-state status for admission, tuition and charge-differential purposes at its meeting on September 21, 1973. The new regulations became effective with the January 1974 term.

An initial determination of in-state status for admission, tuition and charge-differential purposes will be made by the University at the time a student's application for admission is under consideration. The determination made at that time, and any determination made thereafter shall prevail in each semester until the determination is successfully challenged. *The deadline for meeting all requirements for in-state status and for submitting all documents for reclassification is the last day of late registration for the semester the student wishes to be classified as an in-state student.*

The volume of requests for reclassification may necessitate a delay in completing the review process. It is hoped that a decision in each case will be made within ninety (90) days of receipt of a request for redetermination and all necessary documentation. During this period of time, or any further period of time required by the University, fees and charges based on the previous determination must be paid. If the determination is changed, any excess fees and charges will be refunded.

Persons who are interested in obtaining a copy of the regulations or who wish assistance with their classification should contact: Office of Admissions, North Administration Building, University of Maryland, College Park, Maryland 20742; Phone (301) 454-4137.

Students Classified as In-State for Admission, Tuition and Charge-Differential Purposes. Students classified as in-state for admission, tuition and charge-differential purposes are responsible for notifying the Office of Admissions in writing within 15 days of any change in their circumstances which might in any way affect their classification at the College Park Campus.

The written notice of change in circumstances or question concerning the policy of the University of Maryland for the determination of in-state status should be directed to: Office of Admissions, Ground Floor, North Administration Building.

Equal Opportunity Recruitment Program — Office of Minority Student Education

The purpose of the Equal Opportunity Recruitment Program (EORP) is to attract and enroll minorities into the undergraduate level of the University. Through EORP the University seeks to achieve a more representative minority student population among Blacks, Spanish-speaking Americans, American Indians (Native Americans), and Asian Americans. Students receive admissions, financial aid, and general University information from this office. This office also provides information concerning the determination of in-state status.

To aid in attracting minority students to the College Park Campus and to get a more racially balanced campus student resident population, an allocation of resident hall spaces are made available for a percentage of newly entering minority students through EORP.

For more information contact: Equal Opportunity Recruitment Program, Room 0107, North Administration Building; Phone (301) 454-4844.

After working hours a recording system providing general information can be called (301) 454-4847.

Application Procedures

Application Forms. Application forms may be obtained by writing to: Office of Admissions, North Administration Building, University of Maryland, College Park, Maryland 20742.

Application forms are available in high school guidance offices and college counseling centers.

All applicants must comply fully with the directions printed on the application form. Incomplete forms cannot be processed.

Application Fee. A non-refundable $15.00 application fee is required with each application.

Application Deadlines. The University strongly urges an early application for all applicants!

Summer and Fall 1976 Semesters

October 1, 1975:
Applications accepted for Summer and Fall 1976.

November 17, 1975:
Deadline for receipt of applications, transcripts, and SAT results (freshmen only) for freshmen and transfer students who wish to be considered for an *early decision* for fall 1976. Students who meet this deadline and are eligible for admission will receive their application for on campus housing in the first mailing from the Office of Resident Life. This mailing will occur approximately mid-February, 1976. *Because demand for campus housing exceeds available supply, an early decision does not guarantee housing.*

March 1, 1976:
Deadline for foreign student applications. Applicants to the School of Architecture must file an application by this date to be assured of consideration.

July 1, 1976:
Deadline for all undergraduate applications for Fall 1976.

July 15, 1976:
Deadline for receipt of transcripts and SAT results (freshmen only) for freshmen and transfer applicants for Fall 1976.

Spring 1977 Semester

June 1, 1976
Applications accepted for Spring 1977

August 2, 1976
Deadline for foreign student applications

November 15, 1976
Deadline for all undergraduate applications for Spring 1977

December 1, 1976
Deadline for receipt of all transcripts for Spring 1977

The University reserves the right to return the unprocessed applications of out-of-state freshmen and transfer students when our quotas for these students have been filled. *Because of space limitations the University cannot offer admission to all qualified out-of-state applicants nor can it provide housing for a great many of those who are admitted.*

Readmission and Reinstatement

Students who do not maintain continuous registration must apply for readmission or reinstatement when they desire to return to the University. See sections on Withdrawals from the University and Minimum Requirements for Retention and Graduation on page 20.

Readmission. A student who has interrupted his registration for one or more semesters and who was in good academic standing or on scholastic probation at the conclusion of his last semester must apply for readmission.

Reinstatement. A student must apply for reinstatement if he has been academically dismissed, is ineligible for readmission, or has withdrawn from all courses in his last previous semester.

Deadlines. Dismissed students who wish to apply for reinstatement must observe the following deadlines:
Fall semester — July 1
Spring semester — November 1
Summer Session I — April 15
Summer Session II — May 15

Exceptions. Students dismissed at the end of the fall semester may apply for immediate reinstatement no later than seven days before the first day of spring semester registration. Students dismissed at the end of the spring semester who wish to attend the first or second summer session must check with the Office of Admissions regarding current policy for summer sessions.

There are no deadlines for readmission or for reinstatement after an official withdrawal but students are encouraged to apply early. (All applications from withdrawn students are subject to review by the Faculty Petition Board.)

Any student whose application will require clearance from the Judicial Affairs Office, Health Center, or International Education Services Office should file according to the above deadlines for reinstatement.

Applications. Application forms for readmission and reinstatement may be obtained from the Office of Admissions.

Additional Information

For additional information contact the Office of Admissions, North Administration Building, University of Maryland, College Park, Maryland 20742; (301) 454-5550.

Graduate Student Admission

Admission to graduate study at the University of Maryland is the responsibility of the Graduate School. Correspondence concerning application for admission to The Graduate School should be addressed to The Graduate School, University of Maryland, College Park, Maryland 20742.

Orientation Programs

Upon final admission to the University the new student will receive materials about the Orientation and Registration Program. All entering students are encouraged to attend. The primary goals of the program are to inform the student about the University, and to help the student register for the first semester. Through this program the entering student receives a personalized and individual introduction to the University.

Parents also have an opportunity to learn about University life through the Parent Orientation Program. Office location: Student Union Building, Telephone: 454-5752.

See page 26 for more detailed information.

Fees & Expenses

Registration is not completed or official until all financial obligations are satisfied. Returning students will not be permitted to complete registration until all financial obligations to the University including library fines, parking violation assessments and other penalty fees and service charges are paid in full.

Although the University regularly mails bills to students, starting with an estimated bill approximately one month prior to registration, it cannot assume responsibility for their receipt. If any student does not receive a bill before or shortly after the start of each semester, it is his/her responsibility to obtain a copy of the bill by coming to Room 1103, South Administration Building, between the hours of 9:00 a.m. and 4:00 p.m., Monday through Friday.

All checks or money orders should be made payable to the University of Maryland for the exact amount due. Student name and student social security number should be written on the front side of the check. In cases where the University has awarded a grant, scholarship, or workship, the appropriate amount will be deducted on the first actual bill, mailed approximately one month after the start of the semester. However, the first estimated bill mailed at the start of each semester may not include these deductions.

Students may be severed from University services for delinquent indebtedness to the University which occurs or is discovered during a semester. In the event that severance occurs, the individual may make payment during the semester in which services were severed and all these services except housing will be restored. Students removed from housing because of delinquent indebtedness will be placed at the bottom of the waiting list after the financial obligation is satisfied and after reapplying for housing. Students who are severed from University services and who fail to pay the indebtedness during the semester in which severance occurs will be ineligible to preregister or register for subsequent semesters until the debt is cleared. In the event of actual registration in a subsequent semester by a severed student who has not settled his student account prior to that semester, such registration will be cancelled and no credit will be earned for the semester.

No degree will be conferred, no grade issued, nor any diploma, certificate, or transcript of record issued to a student who has not made satisfactory settlement of this account.

Transcript of Records

Students and alumni may secure transcripts of their scholastic records from the Registrations Office. There is a charge of $2.00 for each transcript. Checks should be made payable to the University of Maryland. Transcripts of records should normally be requested in writing at least two weeks in advance of the date when the records are actually needed. No transcript of a student's record will be furnished any student or alumnus whose financial obligations to the University have not been satisfied. Except where required by law, no transcripts are released without written authorization of the student.

A. Undergraduate Fees:

1. Fees for Full-time Undergraduate Resident and Non-Resident Students 1976-77 Academic Year:

a. Maryland Residents

	Total Academic Year Cost
General Fee*	$758.00
Board Contract**	
1) 7 day a wk. contract food plan:	760.00
2) 5 day plan:	700.00
3) 10 meals a week plan:	660.00
Lodging**	699.00
Health Service Fee	20.00

b. Residents of the District of Columbia, other states and other countries:

	Total Academic Year Cost
General Fee*	$2,148.00
Board Contract**	
1) 7 day a wk. contract food plan:	760.00
2) 5 day plan:	700.00
3) 10 meals a week plan:	660.00
Lodging**	799.00
Health Service Fee	20.00

*General Fee includes fixed fee of $620.00 for Maryland Residents or $2,010.00 for Residents of the District of Columbia, other states and other countries plus mandatory fees for the following: instructional materials, athletics, student activities, recreational facilities, auxiliary facilities and registration.

**Increases in board and lodging charges for 1976-77 are under consideration by the Board of Regents at the time of this printing.

2. Fees for Part-time Undergraduate Students

Credit Hour Fee:	$34.00 per credit hour
Registration Fee:	5.00 per semester
Health Fee:	5.00 per semester

The term part-time undergraduate student is interpreted to mean an undergraduate student taking 8 semester credit hours or less. Students carrying 9 semester hours or more are considered to be full-time and must pay the regular full-time fees.

B. Graduate Fees:

1. Maryland Residents:	$50.00 per credit hour
2. Residents of the District of Columbia, other states and other countries:	$85.00 per credit hour

Graduate students are also charged $5.00 a semester for registration fee and $10.00 a semester for health services (9 cr. hr. or more), or $5.00 a semester for health services (8 cr. hr. or less).

An Important Fee Notice. Although changes in fees and charges ordinarily will be announced in advance, the University reserves the right to make such changes without prior announcement.

NOTE: New additional information on Financial Obligations of Student; Disclosure of Information; Delinquent Accounts; and Special Fees, can be found on page vii.

Explanation of Fees

The application fee for the undergraduate programs and the summer sessions partially defrays the cost of processing applications for admission to the University. If a student enrolls for the term for which he or she applied, the fee is accepted in lieu of the matriculation fee. Applicants who have enrolled with the University of Maryland in its Evening Division at College Park or Baltimore, or at one of its off-campus centers are not required to pay the fee since they have already paid a matriculation fee. This fee is not subject to refund or cancellation.

The Fixed Charges Fee is charged to help defray the cost of operating the University's program at College Park.

The Instructional Materials Fee represents a charge for instructional materials and/or laboratory supplies furnished to students.

The Athletic Fee is charged for the support of the Department of Intercollegiate Athletics. All students are encouraged to participate in all of the activities of this department or to attend the contests if they do not participate.

The Student Activities Fee is a mandatory fee included at the request of the Student Government Association. It is used in sponsoring various student activities, student publications and cultural programs.

The Recreational Facilities Fee is paid into a fund which will be used to expand the recreational facilities on the College Park Campus.

The Auxiliary Facilities Fee is paid into a fund which is used for expansion and operation of various facilities such as roads, walks, campus lighting and other campus facilities. These facilities are not funded or are funded only in part from other sources.

Other Fees

Application Fee: $15.00

Pre-College Orientation Program Registration Fee: $26.00 (two day program), **$14.00** (one day program)

Registration Fee: $5.00 (Charged as a separate fee for all registrants except full-time undergraduates)

Late Application Fee: $25.00

Matriculation Fee: $15.00

Graduation Fee for Bachelor's Degree: $15.00

Room Deposit Fee payable upon application for dormitory room: **$50.00** (to be deducted from the first semester room charges at or after registration)

Student Health Fee (each semester): $10.00 (Charged to all full-time students each semester. Full-time employees and staff may not use Health Service Facilities and are not charged the Student Health Fee. Graduate Assistants are not full-time employees.) Five dollars a semester for all part-time students.

Vehicle Registration Fee: $12.00 ($12.00 for first vehicle and $3.00 for each additional vehicle in accordance with published regulations. Payable each academic year by all students registered for classes on the College Park Campus and who drive on the Campus. For cars registered for the spring semester only the fee is $6.00 on the first car and $3.00 for each additional vehicle.)

Special Fee for students requiring additional preparation in Mathematics (MATH 001) per semester: $75.00 (Required of students whose curriculum calls for MATH 110 or 115 and who fail in qualifying examination for these courses.) This Special Math Fee is in addition to course charge. Students enrolled in this course and concurrently enrolled for 6 or more credit hours will be considered as full-time students for purposes of assessing fees. Students taking only MATH 001 pay for 3 credits plus $75. A 3 credit course plus MATH 001 results in a charge for 6 credits plus $75. A full-time student pays full-time fees plus $75.

Fees for Auditors and courses taken for audit are the same as those charged for courses taken for credit at both the undergraduate and graduate levels. Audited credit hours will be added to hours taken for credit to determine whether or not an undergraduate student is full-time or part-time for fee assessment purposes.

Special Students are assessed fees in accordance with the schedule for the comparable undergraduate or graduate classification.

Late Registration Fee: $20.00 (All students are expected to complete their registration, including the filing of Schedule Adjustment Forms on the regular registration days. Those who do not complete their registration during the prescribed days must pay this fee.) Registration is not completed until all fees, including outstanding SAR (Student Accounts Receivable) balances have been paid in full. Any payment which is insufficient to discharge the existing balance plus new fees leaves tuition unpaid and registration incomplete. The $20 late fee will therefore be applied to all students

who register and who have an outstanding indebtedness to the University.

Change of Registration Fee: $2.00 (for each course dropped or added after the Schedule Adjustment Period)

Special Examination Fee: $30.00 per course for full-time students; the part-time credit hour charge for part-time students; see part-time credit hour charges on prior schedule (above)

Cooperative Education Program in Liberal Arts and Business (CO-OP 208-209): **$30.00**

Transcript of Record Fee: $2.00 (each copy)

Property Damage Charge: Students will be charged for damage to property or equipment. Where responsibility for the damage can be fixed, the individual student will be billed for it; where responsibility cannot be fixed, the cost of repairing the damage or replacing equipment will be prorated, among the individuals involved.

Service Charges for Dishonored Checks: Payable for each check which is returned unpaid by the drawee bank on initial presentation because of insufficient funds, payment stopped, post-dating drawn against uncollected items, etc.
For checks up to $50.00: $5.00
For checks from $50.01 to $100.00: $10.00
For checks over $100.00: $20.00

Library Charges: $.25 — Fine for failure to return book from General Library before expiration of loan period per day. Fine for failure to return book from Reserve Shelf before expiration of loan period: First hour overdue on first day: $1.00; After first hour on first day: $2.00; Each additional day: $2.00. In case of loss or mutilation of a book, satisfactory restitution must be made.

Motor Vehicle Penalties: These are described in Traffic Rules and Regulations. (See page 21)

Textbooks and Supplies: Textbooks and classroom supplies — These costs vary with the course pursued, but will average $85.00 per semester.

Payment of Fees: All checks, money orders, or postal notes should be made payable to the University of Maryland. Write student name and student social security number on the face of the check.

Withdrawal or Refund of Fees: Any student compelled to leave the University at any time during the academic year should file an application for withdrawal, bearing the proper signature, in the Office of Registrations. If this is not done, the student will forfeit his right to any refund to which he would otherwise be entitled. The date used in computing refunds is the date the application for withdrawal is filed in the Office of Registrations. The Stop Payment on a check does not constitute withdrawal.

A request for a refund must be processed by the student with the Division of Business Services, otherwise any student account credit will automatically be carried over to the next semester.

In the case of a minor, withdrawal will be permitted only with the written consent of the student's parent or guardian.

Full time students withdrawing from the University will be credited for all academic fees charged to them in accordance with the following schedule:

Period from Date Instruction Begins	Refundable
Two weeks or less	80%
Between two and three weeks	60%
Between three and four weeks	40%
Between four and five weeks	20%
Over five weeks	0%

No part of the charges for room and board is refundable except when the student officially withdraws from the University or when he is given permission by the appropriate officials of the University to move from the residence halls and/or to discontinue dining hall privileges. In these cases, the room refund will be computed by multiplying the number of periods remaining times the pro rata weekly rate after adjusting for a service charge. Refunds to students having full board contracts will be calculated in a similar manner. No room and/or board refunds will be made after the fourteenth week of the semester.

The Food Service identification cards (FSID) must be surrendered to the Office of Registrations before any refund will be processed.

In computing refunds to students who have received the benefit of scholarships and loans from University Funds, the computation will be made in such a way as to return the maximum amount to the scholarship and loan accounts without loss to the University.

A student who registers as a full-time undergraduate will receive no refund of the General Fee when courses are dropped (irrespective of the number of credit hours dropped) unless the student withdraws from the University. Hence, a student changing from full-time to part-time after the first day of classes receives no refund.

A student who registers as a part-time undergraduate student will be given a refund of the credit hour fee for courses dropped during the first week of classes. No refund will be made for courses dropped thereafter.

A special refund schedule applies to full-time students who are drafted into the Armed Services or called up as Reservists.

Financial Aid

The Office of Student Aid provides advice and assistance in the formulation of student financial plans and, in cooperation with other University offices, participates in the awarding of scholarships, loans, and part-time employment to deserving students. Scholarships, grants and loans are awarded on the basis of evident academic ability and financial need. In making awards, consideration is also given to character, achievement, participation in student activities, and to other attributes which may indicate success in college. It is the intent of the committee to make awards to those qualified who might not otherwise be able to pursue college studies. Part-time employment opportunities on campus are open to all students, but are dependent upon the availability of jobs and the student's particular skills and abilities.

Additional information is available from the Director, Office of Student Aid, Room 2130, North Administration Building, University of Maryland, College Park, Maryland 20742.

Scholarships and Grants

Most scholarships and grants are awarded to students before they enter the University. However, students who have completed one or more terms, and have not received such an award, are eligible to apply. It is usually inadvisable for a student to apply for a specific scholarship. Each applicant will receive consideration for all scholarships for which he or she is eligible. Most scholarships are awarded to students who have earned a cumulative grade point average of 3.0 (B) or better. Entering freshmen must submit applications before March 1; students already enrolled in the University may submit applications between January 15 and May 1 in order to receive consideration for scholarship assistance for the ensuing year. Scholarship award letters are normally mailed between March 15 and July 15. Any applicant who does not receive an award letter during this period should assume that he or she has not been selected for a scholarship.

Regulations and procedures for the awarding of scholarships and grants are formulated by the Committee on Financial Aids. All recipients are subject to the academic and non-academic regulations and requirements of the University.

The recipient of the scholarship or grant is expected to make at least normal progress toward a degree, as defined by the Academic Regulations, and to maintain a credit load of 14 semester credit hours.

The committee reserves the right to review the scholarship program annually and to make adjustments in the amount and recipients of awards in accordance with the funds available and scholastic achievement.

Supplemental Educational Opportunity Grants. Under the provisions of the Education Amendments of 1972, grants are available to encourage youth of exceptional financial needs to continue their post secondary school education. A recipient must be a United States citizen enrolled as a full-time undergraduate. The amount of the grant must be matched by an equal amount of some other type of aid provided through the University.

Basic Educational Opportunity Grants. The federal government provides grants to approved students who need it to attend post high school educational institutions. The maximum award is $1400 minus the expected family contribution. In those years when Congressional appropriations are less than needed, eligible students will receive a percentage of their entitlement. Applications are available in senior high schools and post high school institutions.

Maryland State Scholarships. The General Assembly of Maryland has created several programs of scholarships for Maryland residents who need financial help to obtain a college education. The undergraduate programs are (1) General State scholarships, (2) Senatorial scholarships, and (3) House of Delegates scholarships. Students wishing to apply for these scholarships should contact their guidance counselor if a high school senior or the Office of Student Aid if presently attending the University of Maryland. Students who are entering college for the first time must take the Scholastic Aptitude Test in November or December of their senior year. The test is not required of college students who have completed at least 24 semester hours. A general application and a Parent's Confidential Statement should be filed with College Scholarship Service in Princeton, N.J. and a senatorial application with the student's state senator by December 15 for the following academic year. For additional information, contact the Maryland State Scholarship Board, 2100 Guilford Avenue, Baltimore, Maryland 21218.

Local and National Scholarships. In addition to the scholarships provided by the University of Maryland, a student should give careful consideration to scholarship aid provided by local and national scholarship programs. Ordinarily, the high school principal or counselor will be well informed as to these opportunities.

Endowed and Annual Scholarships and Grants

Advertising Association of Baltimore Work/Experience Scholarship. This award is available to an outstanding sophomore or junior interested in an advertising career.

AFROTC College Scholarship Program. Four-year AFROTC scholarships are available to incoming freshmen who qualify. One thousand scholarships are awarded annually to qualified freshmen on a nationwide basis. Application for the Four-Year scholarship is normally accomplished during the senior year of high school. The AFROTC program also provides Two-Year and Three-Year scholarships for selected cadets in the AFROTC program. Those selected receive money for full tuition, laboratory expenses, incidental fees, and an allowance for books during the period of the scholarship. In addition, they receive nontaxable pay of $100 per month. Any student accepted by the University of Maryland may apply for these scholarships. AFROTC membership is required if one receives an AFROTC scholarship.

Air Force Warrant Officers Association Student Aid Program. Scholarship aid has been made available by the Air Force Warrant Officers Association for worthy male or female undergraduate or graduate students in good standing, with preference given to children of Air Force Warrant Officers or other military personnel.

Albright Scholarship. The Victor E. Albright Scholarship is open to graduates of Garrett County high schools who were born and reared in that county.

Agricultural Development Foundation. A number of awards are made to agricultural students from a fund contributed by donors for general agricultural development.

ALCOA Foundation Scholarship Awards of $750 are given to outstanding students majoring in mechanical engineering, civil engineering, electrical engineering and fire protection engineering.

Alumni Scholarships. A limited number of scholarships are made possible through the gifts of alumni and friends to the Alumni Annual Giving Program of the Office of Endowment and Gifts.

Alumni Association of the School of Pharmacy Scholarships. The Alumni Association of the School of Pharmacy of the University of Maryland makes available annually scholarships to qualified prepharmacy students on the basis of character, achievement and need. These scholarships are open only to residents of the State of Maryland. Each scholarship not exceeding $500 per academic year is applied to expenses at College Park.

Alumni Band Scholarship. A limited number of awards to freshmen are sponsored by the University of Maryland Band Alumni Organization. Recipients are recommended by the Music Department after a competitive audition held in the spring.

Mildred L. Anglin Scholarship. This scholarship is made available from an endowed fund sponsored by the Riverdale Elementary School Parents and Teachers Association in honor of Mrs. Anglin who served that school with distinction for forty years as a teacher and administrator.

Ethel R. Arthur Memorial Scholarship. This memorial scholarship fund has been established by Irving J. Cohen, M.D. At least one $250 award is made each year by the Scholarship Committee. A preference is given to students from Baltimore.

Alvin L. Aubinoe Student Aid Program. Scholarship grants up to $500 per school year to students in engineering, preferably those studying for careers in civil engineering, architecture or light construction.

Baltimore Panhellenic Association Scholarship. A scholarship is awarded annually by the Baltimore Panhellenic Association to a student entering the junior or senior class, who is an active member of a sorority, who is outstanding in leadership and scholarship and who needs financial assistance.

Baltimore Sunpapers Scholarship in Journalism. The Board of Trustees of the A. S. Abell Foundation, Inc., contributes funds to provide one or more $500 scholarships to students majoring in editorial journalism.

Bayshore Foods, Inc. Scholarship. A grant of $500 is made available annually to sons and daughters of employees of Bayshore Foods, Inc. of Easton, Md.

Capital Milk Producers Cooperative, Inc. Scholarship. A scholarship of $500 is awarded annually in the College of Agriculture, preferably to a student preparing for a career in the dairy industry.

Dr. Ernest N. Cory Scholarship. This award is made annually to an outstanding junior or senior recommended by the College of Agriculture, preferably one majoring in Entomology.

Dairy Technology Scholarship and Grants. The Dairy Technology Society of Maryland and the District of Columbia provides a limited number of scholarships and grants-in-aid for students majoring in dairy products technology.

The Danforth Summer Leadership Training Scholarship. The Ralston Purina Company offers one summer award to an outstanding male student in the College of Agriculture, who has successfully completed his freshman year. The purpose of this award is to bring together outstanding young men for leadership training.

The Danforth Foundation and the Ralston Purina Company of St. Louis offer two summer awards to outstanding Home Economics women students, one to a junior and one to a freshman. The purpose of these is to bring together outstanding young women for leadership training.

Delaware-Maryland Plant Food Association Scholarship. A $200 annual award is made to an undergraduate who has an interest in agronomy and soil fertility work.

Delmarva Traffic Club Scholarship. An award of $250 to an outstanding junior or senior student, preferably from the Eastern Shore of Maryland, majoring in Transportation in the College of Business and Management.

Delta Nu Alpha Fraternity Chesapeake Chapter—No. 23, Traffic and Transportation Award. An award of $450 to an outstanding senior member of the University of Maryland chapter majoring in Transportation in the College of Business and Management.

Exel Scholarship. A substantial grant for endowed scholarships was made by Deborah B. Exel.

James R. Ferguson Memorial Fund. A scholarship award is made annually to a student enrolled in Animal Science on the basis of academic achievement and financial need.

Anne Arundel County Volunteer Firemen's Association Grant. This tuition and fees grant is awarded to a high school graduate who will enroll in the fire protection curriculum in the College of Engineering. The award is normally for four years.

Baltimore County Volunteer Firemen's Association Grant. This tuition and fees grant is awarded to a student who will enroll in the fire protection curriculum in the College of Engineering. This award is normally for four years.

Ladies Auxiliary to The Maryland State Firemen's Association Grant. This $750 grant is awarded to an outstanding high school graduate who will enroll in the fire protection curriculum in the College of Engineering. The award is normally available for four years.

Maryland State Firemen's Association Grant. A tuition and fees scholarship is awarded annually to an outstanding high school student who enrolls in the fire protection curriculum of the College of Engineering. This scholarship is for four years.

Prince Georges County Volunteer Firemen's Association Grant. An annual tuition and fees scholarship is awarded to an outstanding high school student who enrolls in the fire protection curriculum of the College of Engineering.

Food Fair Stores Foundation Scholarships. Several scholarships are available for $250 per academic year.

Frederick County Holstein Association Scholarship. A scholarship of $200 is awarded annually to a resident of Frederick County enrolled in the College of Agriculture.

Victor Frenkil Scholarship. A scholarship of $250 is granted annually by Mr. Victor Frenkil of Baltimore to a student from Baltimore City in the freshman class of the University.

John D. Gilmore Scholarship has been established for the purpose of assisting deserving student athletes to obtain an education and participate in varsity athletics at the University of Maryland. The recipients should possess, as does John D. Gilmore, outstanding dedication, determination and an undeniable will to win in athletic competition and to succeed in life.

Goddard Memorial Scholarship. Several scholarships are available annually under the terms of the James and Sarah E. R. Goddard Memorial Fund established through the wills of Morgan E. Goddard and Mary Y. Goddard.

John William Guckeyson Memorial Scholarship. A scholarship of $100 is granted annually by Mrs. Hudson Dunlap as a memorial to John William Guckeyson, an honored Maryland alumnus.

Staley and Eugene Hahn Memorial Scholarship Fund. Annual awards of $500 are made by Mr. and Mrs. Walter J. Hahn in memory of their sons to aid outstanding agricultural students from Frederick County.

Robert Half Personnel Accounting and Tax Scholarship. Two awards of at least $100 each are available to outstanding students majoring in accounting. Financial need is not a factor in selection of recipients.

William Randolph Hearst Foundation Scholarships. These scholarships are made available through a gift of the Baltimore News American, one of the Hearst newspapers, in honor of William Randolph Hearst. Scholarships up to $1,000 are awarded annually to undergraduates pursuing a program of study in journalism. Scholarships up to $1,000 are awarded annually for graduate study in history.

Robert Michael Higginbotham Memorial Award Fund. This Fund has been endowed by Mr. and Mrs. Charles A. Higginbotham in memory of their son who was killed in Vietnam. Annual awards are made to promising junior students majoring in mathematics.

A. M. Hoffman Memorial Grant. This gift of $250 per year is normally awarded as a supplement to some other type of student aid to a student with exceptional need. A preference is given to students from Montgomery County. The gift is made available by Mr. and Mrs. David B. Schwartz.

Hyattsville-Horticultural Society Scholarship. A scholarship of $200 is awarded to a student enrolled in Horticulture.

George Hyman Construction Company Scholarship. A tuition scholarship is awarded to a freshmen student in civil engineering. The scholarship may be renewed for three more years.

Inter-State Milk Producers' Cooperative, Inc. Scholarship. A memorial scholarship of $300 is made available to a student in agriculture in honor of F. Bennett Carter.

Paul H. Kea Memorial Scholarship Fund. This fund was established by the Potomac Valley Chapter of the American Institute of Architects in memory of Paul H. Kea, a highly respected member of the chapter.

Venia M. Keller Grant. The Maryland State Council of Homemakers' Club makes available this grant of $100 which is open to a Maryland young man or woman of promise who is recommended by the College of Human Ecology.

Mary Anne and Frank A. Kennedy Scholarships. Presented to outstanding journalism students, from the estate of Mary Anne and Frank A. Kennedy.

Kinghorne Fund Scholarship. A scholarship in honor of Mr. Joseph W. Kinghorne of the Class of 1911 of the College of Agriculture shall be awarded to the student specializing in poultry science having the highest general average at the end of his or her sophomore year. The amount of the scholarship shall equal the tuition on the College Park Campus.

Kiwanis Scholarship. The J. Enos Ray Memorial Scholarship covering tuition is awarded by the Prince George's Kiwanis Club to a male resident of Prince George's County, Maryland, who, in addition to possessing the necessary qualifications for maintaining a satisfactory scholarship record must have a reputation of high character and attainment in general all-around citizenship.

Gary Lee Lake Memorial Scholarship. This endowed fund provides scholarships for students majoring in pre-veterinary science in the College of Agriculture. It was established by his family and friends.

Laurel Race Course, Inc. Scholarship. This fund has been established to provide scholarships for students who are participating in the University Band.

Leidy Foundation Scholarships. A $1500 fund has been established by the John H. Leidy Foundation, Inc. to provide scholarships for educational expenses to worthy students who have financial need.

Leidy Foundation Scholarship. A scholarship of $500 is granted annually to a graduate or undergraduate student preparing for a career in the general field of chemistry.

Helen Aletta Linthicum Scholarship. These scholarships, several in number, were established through the benefaction of the late Mrs. Aletta Linthicum, widow of the late Congressman Charles J. Linthicum, who served in Congress from the Fourth District of Maryland for many years.

Lions Club of Silver Spring Memorial Scholarship. This scholarship covering tuition and fees is available to a worthy graduate of one of the following high schools: Montgomery Blair, Northwood, or Springbrook.

Lions International Scholarship. An award of $500 is available to a freshman who competes in the Lions Club (District 22-C) Annual Band Festival. A recipient is recommended by the Music Department after a competitive audition in the spring.

Prince George's Plaza Lions Club Scholarship. This $300 scholarship is given in memory of Lion John L. Kensinger, Sr. The award is made to a student from Prince George's County whose area of academic concentration is in the field of creative writing.

Lum's Restaurant Scholarship. An annual gift of $1000 is made to the University by Lum's Restaurant, 8136 Baltimore Avenue, College Park, to provide a scholarship to a student in the College of Business and Management.

M Club Grants. The M Club of the University of Maryland provides each year a limited number of awards.

Glenn L. Martin Aerospace Engineering Scholarships. Two scholarships are available to freshmen to cover tuition and fees.

Maryland Cooperative Milk Producers, Inc. Scholarship. A scholarship of $500 is awarded annually in the College of Agriculture, preferably to a student preparing for a career in the dairy industry.

Maryland-District of Columbia Association of Physical Plant Administrators Scholarship. A scholarship for fixed charges and fees is made available to a junior or senior who is interested in making the administration of a physical plant his career. The recipient must be a resident of Maryland or the District of Columbia.

Maryland Educational Foundation Grants. This fund has been established to provide assistance to worthy students.

Maryland Electrification Council Scholarship. This scholarship of $300 is awarded annually to an entering freshman or junior college transfer student enrolled in the agricultural engineering curriculum in either the College of Agriculture or the College of Engineering.

Maryland Holstein Association Scholarship. The scholarship will be awarded to a deserving student in the College of Agriculture who has had a holstein project in 4-H or FFA. The award will be based on financial need, scholastic ability and leadership.

Maryland and Virginia Milk Producers Association Scholarship. A scholarship of $500 is awarded annually in the College of Agriculture, preferably to a student preparing for a career in the dairy industry.

Maryland Pharmaceutical Association Scholarship. The Maryland Pharmaceutical Association makes available annually scholarships to pre-pharmacy students on the basis of character, achievement and need. Each scholarship not exceeding $500 per academic year is used in partial defrayment of fees and expenses at College Park. These scholarships are open only to residents of the State of Maryland.

Maryland State Golf Association Scholarships. A limited number of $500 scholarships are available to undergraduates in the Agronomy Department who have an interest in golf turf work.

Maryland Turfgrass Association Scholarship. A $250 annual award is made to an undergraduate who has an interest in agronomy and commercial sod production.

George R. Merrill, Jr. Memorial Scholarship. Friends of former professor George R. Merrill, Jr. have established this endowed scholarship fund to benefit students in Industrial Education.

Montgomery County Press Association Scholarship. Presented to an outstanding journalism senior residing in Montgomery County.

Loren L. Murray and Associates Scholarships. This fund has been created to provide scholarships for Maryland residents who are admitted to the College of Education.

Dr. Ray A. Murray Scholarship. This award, sponsored by Maryland Chapter No. 32 of the National Institute of Farm and Land Brokers, is to be made to a worthy sophomore in the Department of Agricultural and Resource Economics, College of Agriculture.

National Capital Housewares Club Scholarship. Two scholarships of $250 each are awarded to outstanding students majoring in Marketing in the College of Business and Management.

Noxell Foundation Scholarships. Two scholarships are awarded to senior chemistry majors nominated by the Department of Chemistry.

Douglas Howard Phillips Memorial Scholarship. This scholarship fund has been endowed by Mr. and Mrs. Albanus Phillips, Jr. in honor of their son who met his untimely death in the spring before he was scheduled to attend the University, in order that worthy young male graduates of Cambridge, Maryland High School may have the opportunity he missed.

Pilot Freight Carriers, Inc., Scholarship. An award of $500 to an outstanding student majoring in Transportation in the College of Business and Management.

William H. Price Scholarship. This award is made annually to a worthy student who is already working to defray part of his college expenses.

Presser Foundation Scholarship. Awards are made to undergraduate students who are pursuing their studies with the intention of becoming music teachers.

Ralston Purina Scholarship. A scholarship of $500 is awarded annually to an incoming senior or junior of the College of Agriculture.

Ensign Richard Turner Rea Memorial Scholarship. This scholarship fund has been established by Captain and Mrs. Richard F. Rea in honor of their late son who gave his life while on active duty in the U.S. Coast Guard. Two scholarships up to $500 each are awarded annually to students in engineering.

Read's Drug Stores Foundation Scholarships. The Read's Drug Stores Foundation contributes annually several scholarships to prepharmacy students on the basis of achievement, character and need. Each scholarship not exceeding $500 per academic year is applied to the fees and expenses at College Park. Recipients must be residents of the State of Maryland.

Mary Elizabeth Roby Memorial Scholarship. An endowed scholarship has been established by the University Park Republican Women's Club. Limited awards are made to women entering the junior or senior years who are studying in the field of political science. A preference is given to residents of Prince George's County.

Vivian F. Roby Scholarships. This endowed fund was established through a bequest to the University of Maryland by Evalyn S. Roby in memory of her husband, class of 1912, to provide undergraduate scholarships to needy boys from Baltimore City and Charles County.

Jack B. Sacks Foundation Scholarship Fund. An award of $500 on behalf of the Advertising Club of Metropolitan Washington, Inc. to an outstanding senior Marketing student in the College of Business and Management planning a career in advertising.

Schluderberg Foundation Scholarship Grant. This grant of $500 is awarded in the College of Agriculture to a student enrolled in the animal science or food science curriculum.

Dr. Fern Duey Schneider Grant. A $100 grant is available to a foreign woman student enrolled in the College of Education, who has completed at least one semester in residence at the University. Funds for the grant are contributed by the Montgomery and Prince George's County Chapters of the Delta Kappa Gamma Society.

Arthur H. Seidenspinner Scholarship. An endowed memorial scholarship fund has been established by Mrs. Seidenspinner to assist deserving student athletes to obtain an education at the University. Both Mr. and Mrs. Seidenspinner have been long-time contributors to numerous student aid programs at the University.

Southern States Cooperative Scholarships. Two scholarships are awarded each year to sons of Southern

States members — one for outstanding work in 4-H Club and the other for outstanding work in FFA. The amount of each scholarship is $300 per year and will continue for four years.

Dr. Mabel S. Spencer Scholarship. This scholarship is awarded in honor of Dr. Spencer, distinguished former Professor in the College of Education. A preference shall be given to students in Home Economics Education.

T. B. Symons Memorial Fund. A scholarship award is made annually to a student enrolled in agriculture on the basis of academic achievement and financial need.

Charles A. Taff Scholarship. An award of $250 to an outstanding student majoring in Transportation in the College of Business and Management.

Thomas H. Taliaferro Scholarship. Under the terms of the will of the late Jane G. S. Taliaferro a bequest has been made to the University of Maryland to provide scholarship aid to worthy students.

Tau Beta Pi Scholarship Fund. A limited number of scholarships are made available each year to worthy engineering students by members and alumni of Maryland Beta Chapter of Tau Beta Pi Association, Inc., national engineering honor society.

Veterinary Science Scholarship. A scholarship of $300, provided by the veterinarians of Maryland, will be awarded to a student enrolled in Veterinary Science, selected on the basis of leadership, academic competence and financial need.

Joseph M. Vial Memorial Scholarship in Agriculture. Scholarships totaling $600 per year are made available by Mrs. A. H. Seidenspinner to be awarded upon the recommendation of the College of Agriculture.

Washington Suburban Sanitary Commission Scholarships. Four scholarships are available that pay tuition and fees. Minorities and women will be given a preference. Awardees may be offered an opportunity for summer employment by the WSSC.

Western Electric Scholarship. Two scholarships are awarded to students in the College of Engineering. The amount of the scholarship covers cost of tuition, books and fees not to exceed $800 nor to be less than $400.

Westinghouse Aerospace Division Scholarship. The Westinghouse Electric Corporation has established a scholarship to encourage outstanding students of engineering and the physical sciences. The scholarship is awarded to a sophomore student and is over a period of three years in six installments of $250. Students in electrical or mechanical engineering, engineering physics or applied mathematics are eligible for the award.

Women's Architectural League Scholarship. This fund has been established to aid worthy students in the School of Architecture.

Women's Club of Bethesda Scholarship. Several scholarships are available to young women residents of Montgomery County. Recipients must be accepted in the College of Education or the School of Nursing.

Nicholas Brice Worthington Scholarship. A $500 memorial scholarship is made available to a student in the College of Agriculture by the descendants of Nicholas Brice Worthington, one of the founders of the Agricultural College.

Loans

Loan funds to meet educational expenses are available for students enrolled in the University. The extent of financial need must be clearly established by providing a complete statement of the applicant's financial resources and estimated expenses for the academic year.

Loan awards are normally granted on a yearly basis, although short-term and emergency loans are granted for shorter periods.

To apply for a long-term loan, an application should normally be filed before May 1 for the ensuing year. If funds are available, applications may be considered at other times, but the student should bear in mind that it generally takes about six weeks to process a loan.

Students applying for a loan must have a 2.0 (C) average for courses taken the preceding semester. New freshmen students need a 2.5 average in academic subjects for the previous two years of school.

Loans are not available for non-educational expenses nor are they available for repayment of previously incurred indebtedness.

National Direct Student Loan Program. This loan fund was established by the federal government in agreement with the University of Maryland to make low-interest loans available to students with clearly established financial need. Applicants must be United States nationals (citizens and permanent resident status) and must be enrolled for eight or more credit hours at day school on the College Park Campus.

Approved loans are usually less than $1000 per year. The borrower must sign a note. Repayment begins nine months after the borrower leaves school and must be completed within ten years thereafter. No interest is charged until the beginning of the repayment schedule. Interest after that date is charged at the rate of three percent per annum.

Cancellation provisions are available for qualified service as a teacher of the handicapped and in low income schools, or for military service in areas of hostility.

Institutional Student Loans. Institutional loan funds have been established through the generosity of University organizations, alumni, faculty, staff, and friends. These loans are normally available at low interest rates to upperclassmen only. For specific information, the student should inquire at the Office of Student Aid.

Nursing Student Loans and Scholarships. Under provisions of the federal Health Manpower Act of 1968, financial aid in the form of loans or scholarships is available to qualified students. The recipient must be a full-time student in pursuit of a baccalaureate or graduate degree in nursing, and able to establish financial need. Students submitting applications for financial aid will automatically be considered for both scholarship and loan.

On loans, repayment begins one year after the borrower ceases to be a full-time student and must be completed within ten years. No interest is charged until the beginning of the repayment schedule. Interest after that date accrues at the rate of three percent per annum. Cancellation provisions are available if the borrower is employed as a nurse in a public or non-profit institution or agency; or in the event of permanent disability or death of the borrower.

Law Enforcement Education Program Loan and Grant. Loans: Qualified full-time pre-service students in approved fields may apply for loan assistance up to $2,200 per academic year. The loan is cancelled at the rate of 25 percent per year of full-time employment in criminal justice or repaid at the rate of 7 percent simple interest, commencing six months after termination of full-time study. Grants: In-service employees of police, courts and corrections agencies enrolled in courses related to law enforcement can receive up to $400 per semester (not to exceed cost of tuition and fees). Grant recipients must agree to remain in the service of their employing law enforcement agency for at least two years following completion of their courses. Any student who meets the eligibility requirements for both a loan and a grant may receive both concurrently. Interested students should contact either the dean, University College, or director, Institute of Criminal Justice and Criminology, Division of Behavioral and Social Sciences.

Guaranteed Student Loans. Loan programs have been established through the Maryland Higher Education Loan Corporation and the United Student Aid Fund which permit students to borrow money from their hometown banks or other financial institutions. The programs enable undergraduates in good standing to borrow up to $1,500 per year, and notes may not bear more than seven percent simple interest. Monthly repayments begin ten months after graduation or withdrawal from school. The federal government will

pay the interest for eligible students, while the student is in school. Further details regarding this program may be secured from the Office of Student Aid.

Part-time Employment

More than one-half of the students at the University of Maryland earn a portion of their expenses. The Office of Student Aid serves without charge as a clearinghouse for students seeking part-time work and employers seeking help. Many jobs are available in the residence halls, dining halls, libraries, laboratories and elsewhere on and off campus.

Working during college years may offer advantages in addition to the obvious one of financing a college education. The employed student has a special opportunity to learn new skills, to develop good work habits, and to learn how to get along with people. Sometimes part-time employment experience helps a student choose a vocation or is helpful later in following his or her vocation.

Freshman students who do not need financial aid probably should not attempt to work during the first year at the University. However, students who need to work in order to attend the University are advised to consider employment in one of our dining halls through the Dining Hall Workship program. Under this program a student may earn approximately one-half of his or her board and room by working ten hours per week. After one successful semester the work load may be increased to full room and board at the request of the student.

For positions other than dining service, a student normally cannot make arrangements for employment until he or she is on campus at the beginning of a school session. Application must be made in person and the applicant should have a schedule of classes and study hours so that he or she can seek employment best suited to his or her free time.

The Office of Student Aid welcomes the opportunity to counsel a student about the best type of employment for him or her. However, securing a position through intelligent application and retaining that position through good work is the responsibility of the individual.

College Work-Study Program

Under provisions of the Educational Amendments of 1972, employment may be awarded as a means of financial aid to students who, (1) are in need of the earnings from such employment in order to pursue a course of study at a college or university, and (2) are capable of maintaining good standing in the course of study while employed. Under the work-study program, students may work up to fifteen hours per week during the school year and a maximum of 40 hours during the summer.

A preference is given to those students with the greatest financial need after the application of all public and private grants.

Academic Regulations and Requirements

General University Requirements

In order to provide educational breadth for all students, there have been established the General University Requirements. These requirements consist of 30 semester hours of credit distributed among the three areas listed below. (For an exception to this regulation, see the Bachelor of General Studies Program, See page 126.) At least 6 hours must be taken in each area. At least 9 of the 30 hours must be taken at the 300 level or above. None of the 30 hours may be counted toward published departmental, college or divisional requirements for a degree. *Area A.* 6-12 hours elected in the Divisions of Agricultural and Life Sciences; Mathematical and Physical Sciences and Engineering. *Area B.* 6-12 hours in the Divisions of Behavioral and Social Sciences; Human and Community Resources. *Area C.* 6-12 hours in the Division of Arts and Humanities.

In meeting these area requirements, students may choose from among any undergraduate courses for which they are qualified. The student may select either the pass-fail or letter grading option for these courses as outlined on page 18. Students are urged to consult with academic advisors for guidance in determining which courses in each area best fit individual needs and interests.

Demonstration of competency in English composition: unless the student has been exempted from English composition, at least one course in the subject will be required. Exemption is granted if the student earns an acceptable score on the Illinois Rhetoric Test administered by the Department of English (score announced annually), or a score of 2 on the English Advanced Placement Test, or by satisfactory completion of a similar course at another institution. Students taking a course to satisfy this requirement may apply the credits toward the 30-hour General University Requirement but may not count these credits toward the satisfaction of the minimum 6-hour requirement in any of the three designated areas. Credit for such a course may be in addition to the 12-hour maximum in any area.

Students who entered the University prior to June, 1973 have the option of completing requirements under the former General Education Program rather than the new General University Requirements. Each student is responsible for making certain that the various categories of either set of requirements have been satisfied prior to certification for the degree. Assistance and advice may be obtained from the academic advisor or the Office of the Administrative Dean for Undergraduate Students.

Special note for foreign students

The foreign student is required to take a special classification test in English before registering for the required English courses. He may be required to take Foreign Language 001 and 002 — English for Foreign Students — *before* registering for English 101.

Registration

1. To attend classes at the University of Maryland it is necessary to process an official registration. Registration is final and official when all fees are paid. Instructions concerning registration are given in the *Schedule of Classes* issued at the beginning of each new semester.
2. The schedule adjustment period shall be the first 10 days of classes. During that period, the student may drop or add courses or change sections with no charge. Courses dropped during this period will be made available to other students desiring to add. Courses so dropped during this registration period will *not* appear on the student's permanent record. Courses may be added, where space is available, during this period and will appear on the student's permanent record along with other courses previously listed. After this schedule adjustment period, courses may not be added without special permission of the instructor and the dean or provost of the academic unit in which the student is enrolled.
3. After this schedule adjustment period, all courses for which the student is enrolled (or subsequently adds) shall remain as a part of the student's permanent record. The student's status shall be considered as *full-time* if the number of credit hours enrolled *at this time* is 9 or more. Courses may be dropped with no academic penalty for a total period of 10 weeks in which there are classes, starting from the first day of classes. The permanent record will be marked W to indicate this. (See *Marking System* below.) After this initial schedule adjustment period a charge shall be made for each course dropped or added. (See *Schedule of Fees* above.)
4. An official class list for each course being offered is issued each semester to the appropriate department by the Office of Registrations. No student is permitted

to attend a class if his name does not appear on the class list. Instructors must report discrepancies to the Office of Registrations. At the end of the semester, the Office of Registrations issues to each department official grade cards. The instructors mark the final grades on the grade cards, sign the cards and return them to the Office of Registrations.

5. Courses taken at another campus of the University or at another institution concurrent with regular registration on the College Park Campus may not be credited without approval in advance by the provost of the division from which the student expects a degree. The same rule applies to off-Campus registration or registration in the summer school of another institution.
6. A student who is eligible to remain at the College Park Campus may transfer among curricula, colleges, divisions, or other academic units except where limitations on enrollments have been approved by the Board of Regents.
7. In all cases of transfer from one division to another on the College Park Campus, the provost of the receiving division, with the approval of the student, shall indicate which courses, if any, in the student's previous academic program are not applicable to his or her new program, and shall notify the Office of Registrations of the adjustments which are to be made in determining the student's progress toward a degree. Deletions may occur both in credits attempted and correspondingly in credits earned. This evaluation shall be made upon the student's initial entry into a new program, not thereafter. If a student transfers within one division from one program to another, his or her record evaluation shall be made by the provost in the same way as if he or she were transferring divisions. If the student subsequently transfers to a third division, the provost of the third division shall make a similar initial adjustment; courses marked "nonapplicable" by the second provost may become applicable in the third program.
8. In the cases of non-divisional students, the Dean for Undergraduate Studies shall assume the responsibilities normally delegated to provosts.

Degrees and Certificates

The College Park Campus awards the following degrees: Bachelor of Architecture, Bachelor of Arts, Bachelor of General Studies, Bachelor of Music, Bachelor of Science, Master of Arts, Master of Business Administration, Master of Fine Arts, Master of Education, Master of Library Science, Master of Music, Master of Science, Doctor of Business Administration, Doctor of Education, Doctor of Musical Arts, and Doctor of Philosophy.

Students in specified two-year curricula may be awarded certificates.

No baccalaureate degree will be awarded to a student who has had less than one year (30 credits) of resident work at the College Park Campus of the University. The last 30 semester credits in any curricula leading to a baccalaureate degree must be taken in residence at the College Park Campus. Candidates for the baccalaureate degree in curricula which combine work at College Park and Baltimore must complete a minimum of 30 semester credits at College Park.

The requirements for graduation vary according to the character of work in the different colleges, divisions and schools. Full information regarding specific college and division requirements for graduation will be found in Section II of this catalog.

Each candidate for a degree or certificate must file a formal application for it with the Office of Registrations. This must be done by the end of the third week of the semester or the second week of the summer session at the end of which he expects to graduate.

Credit Unit and Load

The semester hour, which is the unit of credit, is the equivalent of a subject pursued one period a week for one semester. Two or three periods of laboratory or field work are equivalent to one lecture or recitation period. The student is expected to devote three hours a week in classroom or laboratory or in outside preparation for each credit hour in any course.

In order for an undergraduate student to complete most curricula in four academic years his semester credit load must range from 12 to 19 hours, so that he would complete from 30 to 36 hours each year toward his degree. A student registering for more than 19 hours per semester must have the special approval of his or her dean or provost.

Classification of Students

No baccalaureate curriculum requires less than 120 semester hours. Actual classifications run as follows: freshman, 1-27 semester hours; sophomore, 28-55; junior, 56-85; and senior, 86 to at least 120.

A student is permitted to register for upper division courses when granted Junior Standing by his college. This permission shall be based upon earning a minimum of 56 academic hours toward his degree, completing such course requirements as the college may direct, and possessing the minimum required grade point average to remain in the University.

Exceptional students having completed forty-eight (48) semester hours of academic credit and having the approval of the department involved will be permitted to enroll for sufficient upper division courses to complete a normal program. That is, such students must carry lower division courses to total fifty-six (56) semester hours of academic credits and the remainder may be in courses numbered in the 300-499 range.

Examinations

1. A final examination shall be given in every undergraduate course. Exceptions may be made with the written approval of the chairman of the department and the dean or provost. In order to avoid basing too much of the semester grade upon the final examination, additional tests, quizzes, term papers, reports and the like should be used to determine a student's comprehension of a course. The order of procedure in these matters is left to the discretion of departments or professors and should be announced to a class at the beginning of a course. All final examinations must be held on the examination days of the Official Final Examination Schedule. No final examination shall be given at a time other than that scheduled in the Official Examination Schedule without written permission of the department chairman.
2. To expedite arrangements for commencement, final grades of undergraduate candidates for degrees are based on evaluations available at the time grades are required to be submitted.
3. A file of all final examination questions must be kept by the chairman of each department.
4. The chairman of each department is responsible for the adequate administration of examinations in courses under his or her jurisdiction. The deans and provosts should present the matter of examinations for consideration in staff conferences from time to time and investigate examination procedures in their respective colleges and divisions.
5. Every examination shall be designed to require for its completion not more than the regularly scheduled period.
6. A typewritten, mimeographed or printed set of questions shall be placed in the hands of every examinee in every test or examination requiring at least one period, unless the dean or provost has authorized some other procedure.
7. Each instructor must safeguard examination questions and all trial sheets, drafts and stencils.
8. Each instructor should avoid the use of examination questions which have been included in recently given examinations and should prepare examinations that will make dishonesty difficult.

9. Only clerical help approved by the department chairman shall be employed in the preparation or reproduction of tests or examination questions.
10. Proctors must be in the examination room at least ten minutes before the hour of a final examination. Provisions should be made for proper ventilation, lighting and a seating plan. At least one of the proctors present must be sufficiently cognizant of the subject matter of the examination to deal authoritatively with inquiries arising from the examination.
11. Books, papers, etc., belonging to the student, must be left in a place designated by the instructor before the student takes his or her seat, except in such cases where books or work sheets are permitted.
12. Students should be seated at least every other seat apart, or its equivalent, i.e., about three feet. Where this arrangement is not possible some means must be provided to protect the integrity of the examination.
13. "Blue books" only must be used in periodic or final examinations, unless special forms are furnished by the department concerned.
14. If mathematical tables are required in an examination, they shall be furnished by the instructor. If textbooks are used, this rule does not apply.
15. Proctors must exercise all diligence to prevent dishonesty and to enforce proper examination decorum, including abstention from smoking.
16. Where an instructor must proctor more than 40 students, he or she should consult the chairman of the department concerning proctorial assistance. An instructor should consult the department chairman if in his or her opinion a smaller number of students for an examination requires the help of another instructor.
17. No student who leaves an examination room will be permitted to return, except in unusual circumstances, in which case permission to do so must be granted by the proctor prior to the student's departure.
18. All conversation will cease prior to the passing out of examination papers, and silence will be maintained in the room during the entire examination period.
19. Examination papers will be placed face down on the writing surface until the examination is officially begun by the proctor.
20. Examination papers will be kept flat on the writing surface at all times.

Irregularities in Examinations

1. In cases involving charges of academic irregularities or dishonesty in an examination, class work or course requirements by an undergraduate student, the instructor in the course shall report to the instructional department chairman any information received and the facts within his or her knowledge. If the chairman of the instructional department determines that there is any sound reason for believing that academic dishonesty may be involved, he or she shall refer the matter to the dean or provost. The dean or provost will then confer with the student's dean or provost and will check the Judiciary Office records to determine if the student has any record of prior offenses involving academic dishonesty. The dean or provost will then consult with the student involved, and if the alleged academic dishonesty is admitted by the student and is his first offense of this nature, the dean or provost may authorize the department chairman to dispose of the charges, limiting the maximum penalty to disciplinary probation and a grade of F in the course, provided the penalty is accepted by the student in writing. In such case the department chairman will make a written report of the matter, including the action taken, to the student's dean or provost and to the Judiciary Office.

   If the case is not disposed of in the above manner, the dean or provost of the instructional department will appoint an *ad hoc* Committee of Academic Dishonesty consisting of one member from the faculty of the college or division administered by the dean or provost as chairman, one undergraduate student, and one member from the faculty of the student's college or division appointed by the dean of that college or division. If the student's dean or provost and the dean or provost administering the instructional department are the same, a second member of the faculty of the college or division concerned is appointed.

   The dean or provost of the instructional department will refer the specific report of alleged academic dishonesty to this *ad hoc* committee and the committee will hear the case. The hearing procedures before this committee will in general conform to those required for student judicial boards. The committee may impose the normal disciplinary actions and/or impose a grade of F in the course.

   The chairman of the committee will report its actions to the dean or provost of the student's college or division and to the Judiciary Office. The dean or provost of the instructional department will advise the student in writing of the disciplinary action of the committee, and also advise the student of the right to file an appeal to the Adjunct Committee on Student Conduct.

   The student may file the appeal in accordance with the normal procedures to the Adjunct Committee with the dean or provost of the instructional department and the latter will forward it to the chairman of the Adjunct Committee. The chairman of the Adjunct Committee will notify the student in writing of the time, date, and place of the hearing.
2. In cases involving charges of academic irregularities or dishonesty in an examination, class work or course requirements by a graduate student, the above procedure will be followed except that:
   a. The chairman of the instructional department will refer the matter to the Dean for Graduate Studies.
   b. The *ad hoc* Committee on Academic Dishonesty will be appointed by the Dean for Graduate Studies and will consist of two members of the Graduate School faculty, one serving as chairman, and one graduate student.

Marking System

1. The following symbols are used on the student's permanent record for all courses in which he or she is enrolled after the initial registration and schedule adjustment period: A, B, C, D, F, I, P, S, and W. These marks remain as part of the student's permanent record and may only be changed by the original instructor on certification, approved by the department chairman and the dean or provost, that an actual mistake was made in determining or recording the grade.
2. The *mark of A* denotes excellent mastery of the subject. It denotes outstanding scholarship. In computations of cumulative or semester averages, a mark of A will be assigned a value of 4 quality points per credit hour. (See *Minimum Requirements for Retention and Graduation* below.)
3. The *mark of B* denotes good mastery of the subject. It denotes good scholarship. In computation of cumulative or semester averages a mark of B will be assigned 3 quality points per credit hour.
4. The *mark of C* denotes acceptable mastery. It denotes the usual achievement expected. In computation of cumulative or semester averages a mark of C will be assigned a value of 2 quality points per credit hour.
5. The *mark of D* denotes borderline understanding of the subject. It denotes marginal performance, and it *does not represent satisfactory progress toward a degree*. In computations of cumulative or semester averages a mark of D will be assigned a value of 1 quality point per credit hour.

6. The *mark of F* denotes failure to understand the subject. It denotes unsatisfactory performance. In computations of cumulative or semester averages a mark of F will be assigned a value of 0 quality points per credit hour.
7. The *mark of P* is a student option mark, equivalent to A, B, C, or D. (See *Pass-Fail* option below.) The student must inform the Office of Registrations of his selection of this option by the end of the schedule adjustment period. In computation of cumulative averages a mark of P will not be included. In computation of quality points achieved *for a semester*, a mark of P will be assigned a value of 2 quality points per credit hour. (See *Minimum Requirements for Retention and Graduation* below.)
8. The *mark of S* is a department option mark which may be used to denote satisfactory performance by a student in progressing thesis projects, orientation courses, practice teaching and the like. In computation of cumulative averages a mark of S will not be included. In computation of quality points achieved *for a semester*, a mark of S will be assigned a value of 2 quality points per credit hour.
9. The *mark I* is an exceptional mark which is an instructor option. It is given only to a student whose work in a course has been qualitatively satisfactory, when, because of illness or other circumstances beyond his control, he or she has been unable to complete some small portion of the work of the course. In no case will the mark I be recorded for a student who has not completed the major portion of the work of the course. The student will remove the I by completing work assigned by the instructor; it is the student's responsibility to request arrangements for completion of the work. The work must be completed by the end of the next semester in which the course is again offered and in which the student is in attendance at the College Park Campus; otherwise the I becomes terminal (equivalent to W). Exceptions to the time period cited above may be granted by the student's dean or provost upon the written request of the student if circumstances warrant further delay. If the instructor is unavailable, the department chairman will, upon request of the student, make appropriate arrangements for the student to complete the course requirements. It is the responsibility of the instructor or department chairman concerned to return the appropriate supplementary grade report to the Office of Registrations promptly upon completion of the work. The I cannot be removed through re-registration for the course or through the technique of "credit by examination". In any event this mark shall not be used in any computations.
10. The *mark W* is used to denote that the student withdrew from a course in which he or she was enrolled at the end of the schedule adjustment period. This mark shall not be used in any computation, but for information and completeness is placed on the permanent record by the Office of Registrations. The Office of Registrations will promptly notify the instructor that the student has withdrawn from the course.
11. *Audit.* A student may register to audit a course or courses in which space is available. The notation *AUD* will be placed on the transcript for each course audited. A notation to the effect that this symbol does not imply attendance or any other effort in the course will be included on the transcript in the explanation of the grading system.

Pass-Fail Option

1. An undergraduate who has completed 15 or more credit hours at the College Park Campus and has a cumulative average of at least 2.00 may register for courses on the *Pass-Fail* option during any semester or summer session.
2. Certain divisional requirements, major requirements or field of concentration requirements do not allow the use of the *Pass-Fail* option. Certain courses within a department may be designated by that department as not available under the *Pass-Fail* option. It is the responsibility of each student electing this option to ascertain in conjunction with his or her dean, provost, department or major advisor, whether the particular courses will be applicable to his degree requirements under the *Pass-Fail* option.
3. No more than 20 percent of the College Park Campus credits offered toward the degree may be taken on the *Pass-Fail* option basis.
4. Students registering for a course under the *Pass-Fail* option are required to complete all regular course requirements. Their work will be evaluated by the instructor by the normal procedure for letter grades. The instructor will submit the normal grade. The grades A, B, C, or D will be automatically converted by the Office of Registrations to the grade *P* on the student's permanent record. The grade *F* will remain as given. The choice of grading option may be changed only during the schedule adjustment period for courses in which the student is currently registered.

Credit by Examination for Undergraduate Studies

1. Credit may be earned by examination for any undergraduate course, for which a suitable examination has been adopted or prepared by the department granting the credit. When standardized CLEP (College Level Examination Program) examinations are available they may be used. Students who desire to determine which courses may be taken by examination should consult the Office of the Administrative Dean for Undergraduate Studies.
2. Any student may take a course by examination by obtaining an application form from the Administrative Dean for Undergraduate Studies, paying the requisite fees, and taking the examination at a time mutually agreeable to the student and the department offering the course.
3. The applicant must be formally admitted to the University of Maryland, and be in good academic standing. Posting of credit, however, will be delayed until the student is registered.
4. Application for credit by examination is equivalent to registration for a course; however, the following conditions apply:
   a. A student may cancel the application at any time prior to completion of the examination with no entry on the permanent record. (Equivalent to the registration adjustment period.)
   b. The instructor makes the results of the examination available to the student prior to formal submission of the grade. Before formal submission of the grade, a student may elect not to have this grade recorded. In this case a symbol of W is recorded. (Equivalent to the drop procedure.)
   c. No course may be attempted more than twice.
   d. The instructor must certify on the report of the examination submitted to the Registrations Office that copies of the examination questions or identifying information in the case of standardized examinations, and the student's answers have been filed with the chairman of the department offering the course.
5. Letter grades earned on examinations to establish credit (if accepted by the student) are entered on the student's transcript and used in computing the cumulative grade point average. A student may elect to take an examination for credit on a "Pass-Fail" basis under the normal "Pass-Fail" regulations.
6. Undergraduate students may earn by examination no more than half the credits required for the degree.

7. Fees for Credit by Examination as follows:
   a. Fees for CLEP and other standardized examinations are determined externally and are not altered by the University. These credits are treated as transfer credits.
   b. Full-time students are charged $30.00 for each course examination regardless of the number of credits. This fee is paid upon application for the examination and is not refundable regardless of whether or not the student completes the examination.
   c. Part-time students are charged on the same cost-per-credit-hour basis as though they were taking the course in the regular manner.

Degree Requirements

1. It is the responsibility of departments, colleges, divisions, or appropriate academic units to establish and publish clearly defined degree requirements. Responsibility for knowing and meeting all degree requirements for graduation in any curriculum rests with the student. Not later than the close of the junior year, the student should check with the proper authorities to ascertain his or her standing in this respect. For this purpose the student should be sure to preserve the copy of the semester grade report issued by the Office of Registrations at the close of each semester.
2. In order to earn a baccalaureate degree the last 30 semester credits of any curriculum must be taken in residence at the College Park Campus. Candidates for degrees in pre-professional combined programs must complete at least 30 semester hours; nothing stated below modifies in any way this basic requirement. Included in these 30 semester hours will be a minimum of 15 semester hours in courses numbered 300 or above, including at least 12 semester hours required in the major field (in curricula requiring such concentration). All candidates for degrees should plan to take their senior year in residence since the advanced work of their major study normally occurs in the last year of the undergraduate course. At least 24 of the last 30 credits must be done in residence at the College Park Campus; *i.e.*, a student who at the time of graduation will have completed 30 semester hours in residence may be permitted to do not more than 6 semester hours of the final 30 credits of record in another institution, provided written permission is secured in advance from the dean or provost. The student must be enrolled in the program from which he or she plans to graduate when registering for the last 15 credits of the program. These requirements apply also to the third year of pre-professional combined degree programs.
3. While many University curricula require more semester hours than 120, no baccalaureate curriculum requires less than 120 credit hours. It is the student's responsibility to familiarize himself or herself with the requirements of the curriculum. The student is urged to take advantage of the advice on these matters in the departments, colleges, divisions, or Office of Academic Affairs.
4. A student who has completed requirements for and has received one baccalaureate degree must satisfactorily complete enough additional credits so that the total, including all applicable credits earned at College Park or elsewhere, is at least 150 credits. In no case, however, will a second baccalaureate be awarded to a student who has not completed the last 30 credits at the University of Maryland, College Park.
5. A student who wishes to receive simultaneously two baccalaureate degrees from the University of Maryland, College Park, must satisfactorily complete a minimum of 150 credits (161 credits if one of the degrees is the B.Arch. degree in the School of Architecture). The regularly prescribed requirements of both degree programs must be completed. As early as possible and in any case no later than the beginning of the second semester before the expected date of graduation the student must file with the departments or programs involved and also with the appropriate deans and provosts a formal program showing the courses to be offered to meet major, supporting area, college, division and General University and elective requirements of both curricula. No course used in either curriculum to satisfy a major, supporting area, or college or division requirement may be used to satisfy the General University Requirements. If two divisions are involved in the double degree program, the student must designate which division is responsible for the maintenance of records.
6. A general C (2.00) average is required for graduation in all curricula. (See *Minimum Requirements for Retention and Graduation.)*
7. Applications for diplomas must be filed with the Office of Registrations during the registration period or not later than the end of the second week of classes of the regular semester or at the end of the second week of the summer session, at the end of which the candidate expects to receive his degree. Applications filed after the third week of classes of a regular semester or Friday of the second week of a summer session will be retained until the next semester (session) when degrees will be awarded.

Attendance

1. The University expects each student to take full responsibility for his or her academic work and academic progress. The student, to progress satisfactorily, must meet the quantitative and qualitative requirements of each course for which he or she is registered. Students are expected to attend classes regularly, for consistent attendance offers the most effective opportunity open to all students to gain a developing command of the concepts and materials of their course of study. However, attendance in class, in and of itself, is not a criterion for the evaluation of the student's degree of success or failure. Furthermore, absences (whether excused or unexcused) do not alter what is expected of the student qualitatively and quantitatively. Except as provided below, absences will not be used in the computation of grades, and the recording of student absences will not be required of the faculty.
2. In certain courses in-class participation is an integral part of the work of the course. A few examples would be courses in public speaking and group discussion, courses emphasizing conversation in foreign languages, certain courses in physical education, and certain laboratory sessions. Each department shall determine which of its courses fall into this category. It shall be the responsibility of the instructor in such courses to inform each class at the beginning of the semester that in-class participation is an integral part of the work of the course and that absences will be taken into account in the evaluation of the student's work in the course.
3. Laboratory meetings require special preparation of equipment and materials by the staff. A student who is not present for a laboratory exercise has missed that part of the course and cannot expect that he or she will be given an opportunity to make up this work later in the term.
4. Special provision for freshmen: the freshman year is a transitional year. Absences of freshmen in the basic freshman courses will be reported to the student's dean or division officer when the student has accumulated more than three unexcused absences.
5. Excuses for absences (in basic freshman courses and in courses where in-class participation is a significant part of the work of the course) will be handled by the instructor in the course in accordance with the general policy of his department and college.

6. Examinations and tests: it is the responsibility of the student to keep himself or herself informed concerning the dates of announced quizzes, tests and examinations. An instructor is not under obligation to give a student a make-up examination unless the student can present evidence that the absence was caused by illness or by participating in University activities at the request of University authorities. A make-up examination, when permitted, is given at the convenience of the instructor, but must not interfere with the student's regularly scheduled classes.

Deficiency Reports

1. Reports of unsatisfactory work (less than C) will be made only for freshmen in the basic freshman courses. It will be the obligation of all students to assume full responsibility for their academic progress without depending upon receiving official warning of unsatisfactory work.
2. Reports of unsatisfactory work for freshmen in the basic freshman courses will be submitted to the student's dean or provost at the end of the seventh week of the semester.

Dismissal of Delinquent Students

The University reserves the right to request at any time the withdrawal of a student who cannot or does not maintain the required standard of scholarship, or whose continuance in the University would be detrimental to his or her health, or to the health of others, or whose conduct is not satisfactory to the authorities of the University. Specific scholastic requirements are set forth in the Minimum Requirements for Retention and Graduation.

Withdrawals From the University

1. Should a student desire or be compelled to withdraw from the University at any time, he or she must secure a notice of withdrawal from his or her provost, obtain the proper signatures, and submit the notice along with University identification cards to the Office of the Vice Chancellor for Student Affairs. This office will file the withdrawal with the Office of Registrations which will record a mark of W for all courses and notify the instructors of the withdrawal.
2. The effective date of withdrawal as far as refunds are concerned is the date that the notice is received by the Office of the Vice Chancellor for Student Affairs. The Office of Registrations will record the effective date of withdrawal on the student's permanent record.

Readmission and Reinstatement

See page 8 for information regarding deadlines.

Readmission

1. A student whose continuous attendance at the University has been interrupted, but who was in good academic standing, or on academic probation, at the end of the last regular semester for which he or she was registered, must apply to the Office of Admissions for readmission. The student will be readmitted to the program in which he was last registered.

Reinstatement

1. A student who withdraws from the University must apply for reinstatement to the Secretary of the Petition Board, Office of Admissions.
2. A student who has been dismissed for academic reasons may appeal in writing to the Secretary of the Faculty Petition Board, Office of Admissions, for reinstatement. The committee is empowered to grant reinstatement to the University if the circumstances warrant such action.
3. A student who has been dismissed from the University for academic reasons, and whose petition for reinstatement is denied, may again apply for reinstatement any subsequent semester. It is recommended that the student give serious consideration to the previous recommendations of the Petition Board.

Minimum Requirements for Retention and Graduation

1. A minimum of 120 credits of successfully completed (not I, F, or W) course credits are required for graduation in any degree curriculum. (See *Degree Requirements* and *Credit by Examination* above.) Credits transferred, or earned during prior admissions terminating in academic dismissal or withdrawal and followed by readmission, will be applicable toward meeting credit requirements for a degree. (See *Readmission and Reinstatement* above.)
2. A full-time student will be placed on academic probation at the end of any semester in which he or she does not achieve a total of 24 quality points for that semester, except that he will *not* be placed on academic probation for this reason if he or she earns at least 18 quality points on a registration (at the end of the schedule adjustment period) of 9 credits, 20 quality points on a registration of 10 credits, or 22 quality points on a registration of 11 credits. Exceptions are also allowed for all full-time students in their first semester of registration on the College Park Campus, who must earn at least 18 quality points for that semester. This exception does not apply to students who have earned more than 8 credits through previous registration in the University.
3. Any student, full- or part-time, who fails to maintain a minimum *cumulative* average of 1.95 at the end of any semester following that in which the total of credits completed at the College Park Campus (with grades A, B, C, D, P, S or F), plus any credits transferred, is 45 credits, will be placed on academic probation. Credits completed with grades of A, B, C, D, and F, but not S, P, or I will be used in the computation of the cumulative average. The 1.95 requirement applies to first semester transfer students who transfer 45 or more credits.
4. A student who does not meet the academic standards for any given semester will be placed on probation and must display acceptable performance in quality points and cumulative average (if applicable) during the next semester in order to regain good academic standing. A student will be dismissed at the end of the second consecutive, or fourth total, semester of unacceptable performance. Courses for which the mark W is recorded are excluded from all such computations of cumulative average.
5. A student who has been academically dismissed and who is reinstated, will be academically dismissed again if he or she does not meet the academic standards for any two additional semesters after return. In the computation of the cumulative average after return, all credits earned at the University of Maryland will be used.
6. When a student is placed on academic probation or is academically dismissed, the action shall be entered on the student's official and permanent record.
7. Any course may be repeated, but if a student repeats a course in which he or she has already earned a mark of A, B, C, D, P or S, the subsequent attempt shall not increase the total hours earned toward the degree. Only the higher mark will be used in computation of the student's cumulative average. However, the student's quality points in a given semester shall be determined by that semester's grades.
8. Any appeal from the regulations governing academic probation or academic dismissal shall be directed to the Petition Board, which shall be empowered to grant relief in unusual cases, if the circumstances warrant such action.

Athletics

The University of Maryland Department of Intercollegiate Athletics fields men's teams in football, soccer, and cross country in the fall; basketball, fencing, swimming, wrestling, and indoor track during the winter; and baseball, golf, tennis, lacrosse, and outdoor track in the spring. Maryland is a member of the Atlantic Coast Conference and the National Collegiate Athletic Association (NCAA) in the men's programs.

Women's intercollegiate athletic teams include field hockey and volleyball in the fall; basketball, swimming and gymnastics during the winter; and lacrosse and track in the spring. Tennis competition is scheduled in both the fall and the spring seasons. Maryland is a member of the National Association of Intercollegiate Athletics for Women (AIAW) in the women's programs.

Office of the Director of Human Relations Programs

Campus-level progammatic efforts are increasingly emphasized by this Office. The Offices of Provost and the Offices of Vice Chancellor are structured to be directly responsible for affirmative action towards equal opportunity of employees and the implementation of desegregation efforts with respect to undergraduate and graduate students. The Human Relations Office performs a Campus-level monitoring function for the Chancellor directly. It facilitates the operation of the academic Divisions and Vice Chancellor Offices by organizing workshops, conducting organizational development activities, supporting Chancellor Commissions, documenting, analyzing and distributing pertinent information and by consulting with each of these and other offices.

The Human Relations Office also has a liaison relationship to the Campus Senate which has a standing Committee on Human Relations. Finally, this is the Campus-level office to which is referred employee or student grievances based on discrimination after previous efforts by Provosts or Vice Chancellors have failed.

Administrative Offices

Office of the Chancellor

Office of University Relations

The Office of University Relations has responsibility for the official campus public information and public relations programs. The office provides ongoing support to student organizations, campus offices providing student services, and all other segments of the campus community.

News and information services are available to students, as well as publications consultation, design and editorial assistance. Photo, film, and audio services are available to the campus community on a cost basis.

Office of Administrative Affairs

Dining Services

The goal of the University Dining Services is to provide nutritionally balanced and tastefully prepared meals, served in a pleasant and relaxing atmosphere.

Dining Services offer varied meal plans both to Resident Hall students and apartment dwellers. In addition, there are several cash facilities conveniently located on the Campus. To apply for a meal plan come to the Business Office, Hill Area Dining Hall, Telephone 454-2905.

Department of Public Safety

General Responsibilities. The general responsibilities of this unit relates to providing law enforcement and fire and life safety to the College Park Campus. The director of this department advises the public safety or police units on other campuses in the development of consistent operating policies and procedures.

The prime functions of the Police Division, within its jurisdiction, are the preservation of peace and order; the protection of all persons and property; and the prevention and detection of crime. Law enforcement is administered to the University totally through the Department of Public Safety eliminating the necessity of outside police agencies patrolling the Campus. Vitally concerned with human life and property, the members of the Police Division enforce both the laws of the State of Maryland and the regulations of the University.

The Safety Division concerns itself primarily with fire prevention and life safety to insure the well-being of members of the College Park Campus and the preservation of property. Inspection of University buildings and facilities for compliance with state and federal fire codes, maintenance of fire alarms and detection devices, and supervision of fire drills and evacuation practices are integral functions of the Safety Division.

Campus Traffic Rules and Regulations. These regulations apply to all who drive motor vehicles on any part of the campus at College Park.

1. **Purpose of Traffic Regulations:**
   a. To facilitate the work of the University by providing parking space for those who need it most.
   b. To provide parking space for University visitors and guests.
   c. To protect pedestrian traffic.
   d. To assure access at all times of ambulances and firefighting apparatus.
   e. To control vehicular traffic on the Campus.

2. **Registration of Vehicles**
   a. All motor vehicles, including motorcycles and scooters, operated on campus by a person associated with the University, must be registered with the Vehicle Registration Office regardless of ownership, except as noted in Regulation 2c. All student vehicles must be registered in the name of the student who is the legal operator of the vehicle.
   b. Student vehicles must be registered for the current academic year during the applicable registration period. A registration charge will be made for each vehicle. *This fee cannot be refunded.*
      (1) *Fall Semester* beginning in August
      for first vehicle.....$12.00
      each additional vehicle.....3.00
      (2) *Spring Semester* beginning in January
      for first vehicle.....6.00
      each additional vehicle.....3.00
      (3) *Summer Semester*.....3.00
      each additional vehicle.....3.00

      All registrations will expire on the next following August 31. Proof of ownership or legal control will be required for multiple registrations. *Students applying for registration of additional vehicles must present the State vehicle license number and the University of Maryland registration number of their initially registered vehicle for the current academic year.* No charge will be made for replacement of registration sticker required due to damaged bumper of a registered vehicle or because of a replacement for a registered vehicle. Remnants of stickers to be replaced *must* be turned in at the Motor Vehicle Registration Desk.
   c. Resident students who have earned less than 56 semester credits shall be prohibited from operating a motor vehicle on the College Park Campus, and from registering a vehicle under provisions of these regulations, except with special permission. Details are available at the Motor Vehicle Administration Office.
   d. Vehicle registration in no way guarantees a convenient parking space. The fact that all

parking spaces convenient to any specific location are filled is not an acceptable excuse for parking violations. Parking Area 4 is overflow space for all student parking areas. Any registered student vehicle operators who are unable to find spaces in their assigned area may park in Area 4 at any time without penalty. Supervisory personnel in the MVA Office are available to discuss parking problems with any student or faculty/staff member.

e. Parking permits for faculty and staff are issued initially at the time of employment. All permits expire on August 31 of each year, vehicle registration for the following school year may be accomplished by the faculty or staff member's respective department at any time after July 1 of each year. All vehicles must display permits for the current school year after September 30 of each year. Permit decals must be permanently applied on windshield and rear window of vehicle.
f. Only one set of parking permits for each vehicle is authorized.
g. Student vehicles are not considered officially registered until permits are affixed on driver's side of front and rear bumpers or on metal plates affixed to license plates, plainly visible.
h. Temporary parking permits for visiting groups and for special reasons and conditions are available. Requests should be made to the Motor Vehicle Administration Section — Telephone 454-4242.
i. Parking permits must not be transferred to any vehicle other than the one for which they were originally issued.
j. Parking permits must not be defaced or altered in any manner.
k. Temporary and permanent special permits for medical reasons are available. Details are available from the Motor Vehicle Administration Office — Telephone 454-4242.

3. Traffic Regulations:
   a. All motor vehicles are subject to University traffic regulations while on the University Campus. The University assumes no responsibility for loss or damage to private property.
   b. All traffic and parking signs must be obeyed. Between the hours of 11 p.m. and 6 a.m., signs at unmanned security gates and officials posted at security entrances must be obeyed.
   c. It is impossible to mark with signs all areas of University property where parking is prohibited. Parking or driving is definitely prohibited on grass plots, tree plots, construction areas, or any place which will mar the landscaping of the campus, create a safety hazard, or interfere with the use of University facilities.
   d. All regulations must be observed during Registration and Examination periods, except as may be otherwise indicated by official signs. During registration, periods between semesters, final examination periods and summer school sessions, registered vehicles may park in any numbered parking area.
   e. Operation of any motor vehicle in such a manner as to create excessive noise or smoke, or operation of any vehicle which is in an unsafe condition, will result in revocation of parking permit and issuance of a Maryland State Summons for violation of Article 66½ Annotated Code of Maryland.
   f. Pedestrians shall have the right-of-way at all times.
   g. The maximum speed on campus roads is 20 miles per hour. During changes of classes and in areas of pedestrian traffic cars must be driven more slowly.
   h. Vehicles operated by faculty/staff and students, including motorcycles and scooters, must be parked in assigned areas only. Certain parking areas are restricted to Faculty and Academic Staff at all times. This restriction is indicated on the official sign at the entrance to the area. In all other parking areas, unrestricted parking is permitted from 5:00 p.m. to 7:00 a.m. Monday through Thursday, and from 5:00 p.m. Friday to 7:00 a.m. Monday.
   i. Any motor vehicle parked in violation of University Traffic regulations or abandoned on Campus is subject to removal and impounding at the expense of the owner or operator. (See Regulation 4c.)
   j. Specific spaces in parking areas shall not be reserved or marked for any department or individual.
   k. If an unregistered vehicle is used as an emergency substitute for a registered vehicle, it must be parked in the regularly assigned area and an immediate report made to the Motor Vehicle Administration Section, Ext. 4242.
   l. In parking areas which have marked spaces and lanes, a vehicle must be parked in one space only, leaving clear access to adjacent spaces, and without blocking driving lanes or creating a hazard for other drivers.
   m. Parking is not permitted at crosswalks.
   n. Parking or standing is prohibited on all campus roads and fire lanes at all times.
   o. In cases where individuals are permitted to register more than one vehicle for parking on the campus, only one of these vehicles may be parked in the assigned area at any time.
   p. Metered parking spaces must be used in accordance with requirements as stated on official signs. Non-registered student vehicles parked in metered spaces will be in violation of Section 2A.
   q. The fact that a vehicle is parked in violation of any regulation and does not receive a violation notice does not mean that the regulation is no longer in effect.
4. Traffic Information:
   a. The Office of the Campus Police is located in the Service Building and may be reached on University campus telephone extension 3555.
   b. The Cashier's Office and the Motor Vehicle Administration Section are in the Service Building, Campus telephone Ext. 4242.
   c. The term abandonment, as it relates to automobiles parked on property owned or leased by the University of Maryland, shall mean any one or more of the following conditions:
      (1) Any vehicle which has not been moved for thirty (30) days and whose owner or other claimant the University is unable to locate.
      (2) Any vehicle which has not been moved for thirty (30) days and whose identified owner or other claimant refuses to move it.
      (3) Any vehicle on which current license plates are not displayed and which has not been moved for ten (10) days.
      (4) Any vehicle which has not been moved in seven (7) days due to an inoperative condition caused by the removal of necessary parts or a wrecked condition.

   Preferred parking areas for car pools are available. Formation of car pools is encouraged, three or more people constitute a valid car pool. Additional information may be obtained from the Commuter Student Affairs Office, Room 1211H, Student Union Building.
5. Penalties:
   a. Any person connected with the University who operates an unregistered vehicle on the Campus, or who registers such a vehicle in any way contrary to the provisions of these regulations, will be subject to payment of a fifteen ($15.00) dollar penalty in addition to the penalty for any

other regulation violation connected therewith. Unregistered vehicles on which five or more outstanding violation notices have been issued are subject to being towed at owner's expense.

b. Violation of any campus traffic regulation other than improper registration or overtime meter parking, will result in penalty as listed below:
   (1) Penalty for parking a registered vehicle in a parking area other than properly assigned area.....$5.00
   (2) Parking a registered vehicle on a roadway, in a posted fire lane or posted no parking area.....$5.00
   (3) Parking any vehicle, including cycles, on walks, grass area, plazas, and any other places not designated as areas for parking or driving without special permit signed by head of Grounds Division.....$5.00 Violator will be additionally liable for amount of any specific damage caused by such action.
   (4) Minimum penalty for parking in violation of section 3c.
   6:00 a.m.-6:00 p.m.....$20.00*
   6:00 p.m.-6:00 a.m.....$25.00*
   *Towing fee on vehicles with locked steering column $15.00 additional. Penalty and towing fee may be adjusted to reflect actual expenses.

c. Overtime parking in metered space will result in a penalty of two dollars ($2.00) for each maximum time period on the meter.

d. Violations are payable within ten (10) calendar days from date of issue at the office of the Cashier in the General Services Building and an additional penalty of $2.00 will be imposed for failure to settle violations on time.

e. Traffic violation notices issued to University visitors must be signed and returned either in person or by mail with explanation to the Vehicle Administration Office, University of Maryland, College Park, Maryland 20742, or to the University Official visited. *Violation notices must be returned within 10 days after date of issue.* The violation may be voided at the discretion of the Vehicle Administration Office, and if not voidable, will be returned for payment.

f. Violations involving an unregistered vehicle owned by a member of the immediate family of a student may be charged to the student's account unless settled by the individual receiving the ticket, in accordance with stated privileges granted to Visitors and Guests.

g. Persistent violators of traffic regulations will be referred to the Judiciary Office for appropriate action.

h. Vehicles parked in roadways, fire lanes and other areas as described in Section 3c are subject to being towed at owner's expense.

6. Appeals:

a. An Appeals Board composed of a minimum of three students who are members of the Student Traffic Board meets regularly to consider appeals from students charged with violations. Students wishing to appeal a violation must register at the appeals table outside the Judiciary Office, 2nd floor, North Administration Building, where the date and time for the appeal will be furnished the appellant. Traffic tickets must be appealed within ten (10) calendar days from the date of issuance. Overtime parking meter violations are not subject to appeal. A student who does not wish to personally appear before the Board may file a written appeal at the Student Union Information Desk.

b. A special Board composed of designated members of the traffic committee will consider and act upon requests for exceptions to any traffic regulation. All actions of this Board will be final.

7. Parking Areas for Students:

Area 1—West of Cole Activities Building, between Stadium Drive and Campus Drive
" 2—North of Denton Hall Dorm Complex
" 3—Southwest Corner of Campus
" 4—North of Heavy Research Laboratory
" 7—East of U.S. #1, at North Gate
" *9—Vicinity of Cambridge Dorm Complex
" 11—Northeast of Asphalt Institute Building
" 12—South of Allegany Hall
" 14—Loop Roads Front and Rear of Houses on Fraternity Row
" 15—Rear 7402 Princeton Avenue

8. Parking Areas for Faculty and Staff:

" *A—West End of BPA Building
" AA—West of Fine Arts and Education Classroom Building
" *B—Adjacent to Computer Science Center
" BB—West of Chemistry Building
" C—Adjacent to Turner Laboratory (Dairy)
" CC—Barn area
" *D—Rear of Journalism Building
" DD—East of Space Sciences Building
" *E—Adjacent to Engineering Buildings
" EE—North of Engineering Laboratory Building
" *F—Adjacent to Fire Service Extension Building
" FF—East of Animal Science Building
" *G—Between Silvester Hall and Skinner Building
" GG—South Center of Adult Education
" *H—Adjacent to Symons Hall and Holzapfel Hall
" HH—Adjacent to H. J. Patterson Hall — Botany
" I—Rear of Molecular Physics Building
" J—West of Annapolis Hall
" K—Adjacent to General Service Building
" KK—Rear Chemical Engineering Building
" L—Administration-Armory Loop
" *M—Adjacent to Infirmary
" *N—North of Dining Hall #5 and East of Elkton Hall
" NN—Adjacent to Building #201
" O—East and West of School of Architecture Undergraduate Library
(*OO—West Portion Only)
" OO—Adjacent to Zoology-Psychology Building and Undergraduate Library
" P—East of Wind Tunnel
" *PP—Between Math Building and Cyclotron
" Q—Rear of Jull Hall
" *R—Circle in front of Byrd Stadium Field House, Stadium Garage and adjacent to Preinkert Field House
" RR—East of Asphalt Institute
" *S—Special, Food Service
" T—North of Engineering Laboratory Building
" TT—Service Area West of Physics Building
" U—Rear of McKeldin Library
" V—South of Main Food Service Facility and West of Building CC
" *W—Between Skinner Building and Taliaferro Hall
" X—Rear of Chemistry Building
" *XX—West — New Chemistry Wing
" Y—West of Chapel
" *YY—West of Cumberland Hall
" Z—Adjacent to Cole Field House, West Side
" *Z—Rear Cole Field House
" Z Annex — West of new Physical Education Building
" LC—Lord Calvert Apartments
" UH—University Hills Apartments
" 17—Special Parking for use of Center for Adult Education

*Restricted at all times

Office of Student Affairs

The Division of Student Affairs is responsible for coordinating programs and services which enhance the life and welfare of students.

Commuter Affairs, Resident Life, Orientation, Greek Affairs, Counseling Center, Judiciary Office, Veterans Affairs, Office of Campus Activities, the Health Center, and the Student Union are organized to facilitate individual student development by meeting specific student needs. In addition, Student Affairs offices strive to develop a Campus environment which fosters positive learning experiences and individual growth.

Office location: 2108 North Administration Building. Telephone: 454-2925.

Office of Campus Activities

The Office of Campus Activities provides advising, consultation, and assistance to Campus organizations, in order to enhance the educational growth of leaders, members, and associates. Efforts focus on establishing various Campus programs for the benefit of the University community. The office maintains records pertaining to student activities and coordinates the resources of student groups and other Campus agencies to promote ongoing functions.

Office location: 1211 Student Union Building. Telephone: 454-5605.

The Commuter Affairs Office

The Commuter Affairs Office has been established to assist, advocate, and assess commuter students' desires, needs, and problems while attending the University of Maryland.

The office has established services which provide assistance in helping the commuter become more a part of the University community.

Off-Campus Housing aids the student, faculty or staff member who is seeking off-Campus housing, with listings, information, free phone service and counsel on landlord-tenant problems.

Car Pools. A car pool program has been established as a low cost alternative to each student driving his own car. The students can sign up for the program at the beginning of each semester. If the car pool has three or more participants the students are eligible for preferred parking spaces. The car pool can help to provide financial gains for the commuter and also provides the opportunity for social contact with other commuters.

University Commuters Association. The Commuter Affairs Office serves as the advisor to the University Commuters Association which occupies a unique position in the structure of the University as the official undergraduate student organization which represents the commuters' interests. UCA has the responsibility of providing social, athletic, and experimental programs for the commuters.

Peer Commuter Counselors. This is a program to help new commuter students work through the problems and alienation often inherent in commuting. Upper class student volunteers have been trained as trouble shooters and helpers for the commuting student. Peer counselors are always present to assist other students with any concern.

Shuttle Bus. The evening Campus Shuttle Bus system is operated by the Office of Commuter Affairs for the security and convenience of all students. Schedules are available at the Student Union Information Desk. The Office of Commuter Affairs is located in Room 1211-H, in the Student Union. Telephone: 454-5274.

Counseling Center

Psychologists provide professional counseling services for students with educational-vocational and emotional-social adjustment concerns. Educational specialists provide individual and group work for improving reading and study skills. No appointment is needed for initial conferences.

Available in the reception lobby are occupational and educational information, plus tape recorded conversations with academic department chairmen about their disciplines.

The center provides consultation to a variety of groups and individuals concerning organizational development and group productivity. Other programs include a series of self understanding and development groups for interested students and staff.

The center provides a wide variety of research reports on characteristics of students and Campus environment.

National testing programs (CLEP, GRE, Miller Analogies, etc.) are administered by the Counseling Center as well as testing for counseling purposes. Office location: Shoemaker Building. Telephone: Counseling Services 454-2931; Reading & Study Skills Lab 454-2935.

Cultural Study Center

The purpose of the Cultural Study Center is to study minority and other student-cultural subgroups at the University of Maryland, The center is headed by a minority faculty member, and its research areas include the socioeconomic and psychological development and background of minority students, their Campus experiences, academic and social adjustments, and problems of student life. This information assists the Office of Minority Student Education in planning curriculum and program development for the minority student population.

The Cultural Study Center seeks to produce positive change by distribution of its research findings to the administration, faculty, students, and other groups. The Cultural Study Center hopes to produce "data that make a difference" in how students from various cultural groups are viewed, and will take the responsibility of following up its research findings by pointing out and encouraging appropriate action to initiate positive changes whenever the findings clearly indicate that such changes could and should be made.

The Cultural Study Center is located in the Main Administration Building, Room 2101, University of Maryland, College Park, Maryland 20742. Office number: 454-4698.

Greek Life Office

This office serves as the liaison between Maryland's 21 national sororities and 25 national fraternities, and the University administration. The Office of Greek Life assists in the development of programs and operations for the Panhellenic and Interfraternity Councils. Through the utilization of total University resources, the staff assists the students with leadership and management training, the coordination of philanthropic projects, membership recruitment, public relations and the participation of the Greek system within the total education of the University community.

Office location: Student Union, Rm. 1211C. Telephone: 454-2736.

Health Services

The University Health Center is located on Campus Drive directly across from the Student Union. Both graduate and undergraduate students are eligible for health care at the Health Center. Services provided include both emergency and routine medical care, mental health evaluation and treatment, health education, laboratory, x-ray, and gynecological services, and upon referral from a Health Center physician, dermatological and orthopedic services.

Students can best be seen by calling the Health Center for an appointment. Students who are injured or are too ill to wait for an appointment can be seen on a walk-in basis. Walk-in patients may encounter a longer wait than

appointment patients; however, emergencies always receive highest priority.

The Health Center is open 8:00 a.m.-5:00 p.m. weekdays, with a physician available in the building until 10 p.m. for urgent care. Weekend and summer school hours are posted, and emergencies are seen twenty-four hours a day. During extended breaks and holidays, the Health Center is usually closed.

In paying the health fee at registration, a student becomes eligible for routine medical care and professional services at the Health Center. Charges however, are made for certain laboratory tests, all x-rays, casts and allergy injections. It should be noted that the mandatory health fee is not a form of health insurance.

It is strongly recommended that each student maintain some type of Health Insurance coverage. Recognizing that many family medical plans do not provide coverage for college age students, the University has negotiated with a local insurance company to provide a voluntary comprehensive student insurance program. This low cost policy includes coverage for illness and accident in the range of up to $1,000 with a major medical provision of $15,000 for serious cases. These coverages are based generally on 80% of the direct cost. This policy provides benefits for hospital, surgery, emergency, laboratory, x-ray, and limited coverage for mental and nervous disorders. Family and maternity options are also available at an increased premium.

For information call: 454-3444. Appointments: 454-4923. Mental Health: 454-4925. Women's Health: 454-4921. Health Education: 454-4922.

Judicial Affairs Office

The campus Judicial Affairs Office effects discipline of undergraduate and graduate students on the College Park Campus. The Board of Regents has established the framework of a judiciary program which emphasizes personal growth and development. The goals of judicial actions are largely educative and preventive. Office staff members review reports of alleged misconduct, contact those individuals involved, and, if necessary, schedule the case for an administrative hearing. In addition, the office lends limited assistance to different offices of the University in various legal and administrative matters, particularly those related to Student Affairs. The Office staff acts in a liaison capacity with the State Court system and various law enforcement and medical authorities as required. Office location: Second Floor North Administration Building. Telephone: 454-2927.

General Policy. The University of Maryland is a large educational institution. It is also a community, and as such has the inherent right to preserve order and maintain stability by setting standards of conduct and prescribing procedures for the enforcement of those standards. The University of Maryland embraces the tenet that the exercise of individual rights must be accompanied by corresponding individual responsibility. Thus, by accepting membership in the University community, the student acquires rights in, as well as responsibilities to, the entire University community.

University students are at once citizens in the larger community and members of an academic community. In the role as citizen, the student is free to exercise fundamental constitutional rights. Rights and responsibilities under local, state and national laws are neither abridged nor extended by status as a student at the University of Maryland. However, as a member of an academic community, he or she is expected particularly to meet these behavioral requirements which attend his/her membership and which are required by the University's pursuit of its objectives. The fulfillment of the University's purpose can be carried on only in an atmosphere of personal and academic freedom, one in which the rights and responsibilities of all members of the academic community are fully protected. The maintenance and/or restoration of such an atmosphere is the basis for a disciplinary structure within the University.

Official University sanctions will be imposed or other appropriate action taken only when a student s observable behavior distinctly and significantly interferes with the University's primary educational objectives and/or to the University's responsibilities for protecting the safety, welfare, rights, and property of all members of the University community, persons coming on to the University property and of the University itself.

Students charged with violating University regulations or policies are guaranteed fundamental fairness in the handling of the charges, the conduct of hearing, the imposition of sanctions, and the rights of appeal.

The University Judiciary Program. Discipline is properly the concern of the entire University community — the student body, the faculty, the staff, and the administration. Particular provision is made in the Judiciary Program for students to adjudicate cases of student misconduct.

The staff of the Judicial Affairs Office trains, directs and advises the efforts of students, faculty and staff in disciplinary concerns so as to meet the unique personal needs and legal rights of the student involved, as well as responding to the requirements of the community. In meeting that responsibility the Office's main functions are (1) interviewing and counseling students involved in disciplinary situations; (2) processing reports and correspondence which deal with disciplinary matters; (3) scheduling, coordinating and supervising activities of the various Judicial Boards; (4) reviewing and/or approving the recommendations of these boards; (5) maintaining a central file of student disciplinary records.

Cases may be disposed of by administrative courts, termed Judicial Boards, or by Office staff. Although most cases are handled by the staff in accordance with the accused student's wishes, students may choose a Judicial Board hearing and are encouraged to do so. The Judicial Boards are comprised of selected outstanding students who are empowered by the University to hear cases and recommend sanctions.

General Statement of Student Responsibility. Students are expected to conduct themselves at all times in a manner consistent with the University responsibility of ensuring to all members of its community the opportunity to pursue their educational objectives, and of protecting the safety, welfare, rights, and property of all members of the community and of the University itself.

Suspension of a Student From Class. Discipline in the classroom is the responsibility of the faculty member in charge of the class. Misbehavior which disrupts or interferes with the educational efficiency of a class is considered sufficient cause for suspending the student from that class. If a student is suspended from a class for disciplinary reasons, he/she must report immediately to the department chairperson. The department chairperson will investigate the incident and report it to the academic dean or division chairperson, and to the Judicial Affairs Office in order to determine whether past disciplinary action has been taken against the student. The department head will then write a letter to the student indicating the disposition of the case. The student is required to present this letter to his/her instructor for readmission to the class. A copy of this letter is sent to the Judicial Affairs Office for maintenance in its central disciplinary files. Disruption of a class by a student not enrolled in that class can be referred to the Judicial Affairs Office. Disruption by a non-student can be referred to the Campus Police.

Suspension of a Student from Activities or University Facilities. The individual or group of individuals in charge of any department, division, organization, building, facility or any other area of the University (e.g., dining hall, Student Union, etc.), shall be responsible for student discipline within such units. The person responsible for each such unit may suspend the student or student organization from the unit. The suspended

student or representative of the student organization will be referred immediately to the Judicial Affairs Office. A file of such action shall be maintained in the Judicial Affairs Office.

Transaction Plates. Official University of Maryland transaction plates are issued to all registered undergraduate and graduate students. The plate is for use only by the student to whom issued and may not be transferred or loaned to another for *any* reason. Violations will be referred to the Judicial Affairs Office. Loss of the transaction plate must be reported *immediately* to the I.D. card section, Office of Admissions and Registrations. A charge of $3.00 is made for duplicate cards.

General University Regulations Applicable to All Students. The General University Regulations, judicial board procedures and other policies and regulations are printed in an appendix to the *Student Handbook* which is distributed to students at the beginning of each fall semester.

Orientation — Maryland Preview

Upon admission to the University, the student will receive materials about Maryland Preview, the registration program offered by the Office of Orientation. The primary goals of the program are to inform the student about the University and provide advisement and registration for the first semester. Maryland Preview is conducted on the College Park Campus during the summer months and at other times during the year. Each freshman will attend with a group of future classmates.

The new student will engage in:

1. Formal and informal discussions about University life, and the standards of performance that the University expects.
2. A conference with an academic advisor who will assist him or her in selecting and registering for courses.

Through this program, the entering student receives a personalized and individual introduction to the University. Many of the sessions offered will be presented by undergraduate student advisors who have been carefully selected and trained to assist new students.

All entering freshmen are urged to attend.

Transfer Preview. A special program is offered for transfer students. This program includes a conference with advisors to explain academic requirements, registration for classes, and a general orientation to Campus itself. The program is particularly geared to the needs of upperclassmen and their special concerns.

Parent Preview. Running concurrently with the summer programs for freshmen and transfer students is an orientation program for the parents of new students. Here, parents have an opportunity to learn about the academic, cultural, and social aspects of University life from administrators and staff, as well as from the student advisors who lead the student groups.

Religious Programs

A broad range of religious traditions is represented by the several chaplains and religious advisors at the University. Individually and cooperatively, they offer many services including counseling, worship, study opportunities here and abroad, personal growth groups, and opportunities for service and involvement. Office location: University Memorial Chapel. Telephone: 454-5783.

Resident Life

This office administers, supervises and coordinates all aspects of the Campus residence halls facilities, including management operation and educational-social-recreational programming.

Accommodations are in semi-autonomous residential communities which vary considerably with respect to hall architecture and facilities available. Each community is directed by a full-time professional and a staff of full- and part-time professional and para-professional personnel who help to insure that community programming, physical plant and administrative needs are met. Staff work closely with supporting Campus agencies to provide services in accord with University and State expectations. Each community enjoys considerable freedom to develop in a manner which reflects the personalities, interests and needs of its residents.

Spaces made available by departing upperclass-persons are available for new to housing students. Each year the number of spaces available to freshpersons and transfer students is limited and may not exceed 2,500 spaces. Application is required, though any assumption that admission to the Campus or submission of a residence halls application guarantees or implies housing space is unwarranted. The likelihood of receiving a space by the start of classes and the advisability of pursuing other housing alternatives is provided each individual shortly after application.

Inquiries should be directed to Information Unit, Office of Resident Life, 3117 North Administration Building, University of Maryland, College Park, 20742, (301) 454-2711.

The Maryland Student Union

The Maryland Student Union is the community center of the College Park Campus for all members of the University — students, faculty, staff, alumni, and their guests. The Union is not just a building; it is also an organization and a program. The Union provides for the services, conveniences, and amenities of the University.

The Union was built and furnished without the help of state or federal funds. The building and furnishings with each stage of construction came from student fees. Funds for operating expenses and additional furnishings came from student fees and various Union revenue producing avenues. The Union pays for its own utilities and maintenance expenses. It is, therefore, a self-supporting enterprise.

Building Hours:

Monday-Thursday	7 a.m.-12 Midnight
Friday	7 a.m.-1 a.m.
Saturday	8 a.m.-1 a.m.
Sunday	12 Noon-12 Midnight

Student Union Services and Facilities

Services include:

- Bookstore
- Bulletin Boards
- Campus Reservations
- Check Cashing
- Display Showcases
- Food Service
  - Snack Bar
  - Cafeteria
  - Tortuga Room
  - Vending Room
  - Banquets and Catering
- Information Center
  - Lounges
  - Meeting Rooms
    - Size from 8-1000 people
  - Notary Public(s)
  - Recreation Center
    - Bowling Lanes
    - Billiards Room
    - Table Games Rooms
    - Pin Ball Machines
  - Sign Shop
    - Signs — plastic, letterpress, embossograf
    - Duplicating — ditto, mimeograph, offset
    - Copy Machine
  - Student Offices
  - TV Room
  - Ticket Office
    - Campus Concerts
    - Selected off-Campus events

Tobacco Shop
U.S. Postal Service Automated Facility
William L. Hoff Movie Theater

Directory

Information Center	454-2801
Administrative Offices	454-2807
Bowling-Billiards	454-2804
Program Office	454-4987
Reservations-Union	454-2809
Reservations-Campus	454-4409
Sign Shop	454-2801
Ticket Office	454-2803
University Program Board	454-4546

Veterans Affairs

Under a new program, three Veterans Administration counselors now work on Campus full time to assist veterans, their dependents, and service men with all VA related questions and problems. These representatives can offer you help in getting your monthly educational assistance checks, as well as other less known but available benefits. Some of the other benefits you may be interested in are: up to $720 in tutoring assistance, low-cost group life insurance, vocational rehabilitation services; educational loans of up to $800 per year; guaranteed home loans; and compensation for service-connected disabilities.

Related information, such as facts on individual state bonuses, removal of SPN codes from your military discharge (DD214), and University of Maryland Veterans Club activities, is also available for you.

The counselors are available on a walk-in basis during normal office hours in Rooms 1130 or 2108, North Administration Building. Telephone: 454-5276, and 454-5734.

Student Aid

The Office of Student Aid administers a variety of financial assistance and student employment opportunities, primarily based on the need of the applicant. The staff of the office is available for individual counseling on matters pertinent to the financial planning of the student body.

See page 10 for more detailed information on opportunities for financial assistance.

International Education Services

The Office of International Education Services provides a wide variety of services designed to assist foreign students to make the necessary adjustment to American university and community life and to help them derive the maximum benefit from their experience in the United States. Services include advising on admission to the University, issuance of immigration documents, special orientation programs, emergency loans, assistance with securing housing, information about educational, cultural, and social opportunities, and personal advising. Some of these services are available also for visiting foreign faculty. For American students, the office provides information about opportunities for travel and study abroad.

Information, forms and assistance in making necessary arrangements for complying with immigration regulations are available at the Office of International Education Services. Information regarding the filing of income tax returns may also be secured from the same office.

Foreign students are subject to the same regulations that govern the academic life and personal conduct of American students enrolled in the University. Office location: 2nd floor, North Administration Building. Telephone: 454-3043/4.

Office of the Administrative Dean for Undergraduate Studies

General. The Office of the Dean for Undergraduate Studies has overall responsibility for undergraduate advisement on the departmental, college and divisional levels. The office maintains the General Undergraduate Advisement Office with a staff of advisors for students who have not yet decided upon a major. Advisors are likewise available for students interested in pre-professional preparation for medicine, dentistry and law. Transfer or handicapped students with special academic problems can also be advised through this office.

This office supervises a number of special academic programs, including the Bachelor of General Studies Degree Program, the General Honors Program and the Individual Studies Program. The office interprets and enforces academic requirements and regulations for undergraduates and administers the program of Credit by Examination.

Academic service components of this office include the Office of Minority Student Education, the Career Development Center, and the Office of Experiential Learning Programs (Cooperative Education, internships, volunteer programs [PACE]).

The Office of the Dean for Undergraduate Studies is located in Room 1115 of the Undergraduate Library.

Office of Academic Affairs

UMCP Career Development Center

GENERAL. The Career Development Center (CDC) encourages, supports and assists students from all departments in considering early and systematically the questions which are central to career concerns: *What is important to me? What career areas are possible for me? What career areas are probable for me?*

Career Development Center programs and services are designed to be used most effectively by students beginning in the freshman year, and continuing throughout the college years. The student who begins early to put his or her Career Education options together will be in the best position to place himself/herself in a meaningful and rewarding position upon leaving the University of Maryland, College Park.

The Career Development Center is located in Terrapin Hall. Telephone: 454-2813.

CAREER DEVELOPMENT CENTER PROGRAMS AND SERVICES

Educational – a course in Career Development and Decision Making (EDCP 108-D, 1 credit). Designed for freshmen and sophomores, the course has the following objective: to build a basis for effective placement during life by teaching career decision-making skills, values clarification, career education resources and their use, job-hunting, job getting (and holding).

Career Information – a basic resource for career exploration and decision making is the Career Library (Phone 454-4840). It contains comprehensive reference materials on varied aspects of work, education, lifestyles, career planning, career exploration and placement. Utilized by approximately 19,000 persons annually in recent years, the Career Library draws on the realism of the larger off-campus community. The Career Development Center also generates numerous printed and video-taped career materials available at the CDC, in Academic Division offices, and in the Non-Print Media Center on the fourth floor of the Undergraduate Library.

Career Advising – Experienced professionals assist students in identifying career questions, strengths, interests, in developing career strategies and utilizing resources advantageously. Phone the Career Development Center at 454-2813 to learn of walk-in advising hours or to arrange an appointment. CDC Career Advisors also may be reached through the five Academic Division offices.

Placement – The placement aspect of CDC services is designed to optimize the individual's effective transition from the University to another sector of society, whether it be work, specialized training, graduate/professional school, etc. Placement services include:

1. Workshops and/or information in job-seeking skills, resume' preparation, interviewing skills.
2. On-campus interviews by employers, graduate schools, and employing school systems (Phone 454-4582 for information).
3. Job Listings in the Career Library.
4. Credentials Service for seniors in the College of Education (Optional for graduate students seeking jobs in education).
5. Comprehensive job strategy information in the Career Library.

Bachelor of General Studies Degree Program

WHAT IS THE BGS PROGRAM? The Bachelor of General Studies degree (BGS) differs from other degrees in that it is a degree without a concentration in a specific discipline or department. It permits the student to obtain an education in as broad a set of disciplines or thought patterns as are offered at the College Park Campus, without insisting that he or she adhere to a previously defined curriculum with a departmental or divisional orientation.

WHAT ARE THE REQUIREMENTS? To receive a Bachelor of General Studies degree, a student must satisfy the following requirements:

1. A minimum of 120 credits must be accumulated with a grade point average of at least 2.0 in all courses.
2. No more than 30 credits in any one department may be applied toward the required 120 credits.
3. The courses taken must be distributed over at least three divisions with a maximum of 60 credits in any one division counted toward the required 120 credits.
4. At least 45 credits must be taken at the upper level (courses numbered 300 or higher); a 2.0 average must be obtained in all upper level courses.
5. The student must be registered as only a Bachelor of General Studies major for at least the last 30 credits immediately preceding the awarding of the degree.
6. The student pursuing the BGS program shall be advised by a faculty member either appointed by or acceptable to the Dean of Undergraduate Studies.

No other University degree requirements, such as General University Requirements, physical education, health, etc. apply to the BGS.

WHAT KIND OF STUDENTS ARE IN THE BGS PROGRAM? Many of the over 400 BGS students are genuinely exploratory students — people who wish the broadest possible education and who wish to pick and choose their courses from a wide range ot disciplines. Others are interested in a particular set of courses which are not available within a given major, and are essentially "designing their own major" within the broad framework of the BGS. Most of the BGS students are interested in the flexibility which the BGS program allows them.

WHAT HAPPENS TO BGS STUDENTS WHEN THEY GRADUATE? The BGS is not designed to meet graduate school admission requirements or professional employment requirements. Therefore, the reception of an individual student by graduate schools and employers depends on the student, what kind of a BGS program he or she has put together, and what type of school or employment he or she is applying for. A recent study of the first BGS graduates indicated that a large percentage went into business or government, some went on to professional school and the remainder were in a variety of occupations.

HOW DO I APPLY? See Dr. Judith Sorum, Assistant Dean for Undergraduate Studies, in 1115 Undergraduate Library, X2530/31.

Office of Experiential Learning Programs. The Office of Experiential Learning Programs (ELP) supervises three types of learning opportunities involving participation in the work of the community and the Campus. These programs encourage students to test classroom learning in work situations, explore career possibilities by direct participation, or enhance their personal development through work and volunteer experiences. The programs include:

1. Cooperative Education Program in Liberal Arts and Business. This program allows students to alternate on-campus study with between sixteen and twenty weeks of paid work experience in business, industry, and government agencies. To be eligible, students must have completed 36 hours of undergraduate work with a 2.0 grade point average. It should be noted, however, that most employers select on a competitive basis.

2. *Internships and Field Experience Courses.* Many academic departments offer opportunities for students to earn academic credit (usually 3-6 hours) through participation in activities in the community, accompanied by an appropriate academic product stemming from the experience. ELP will help students to match their interests with existing courses and community placements and find departments willing to sponsor activities proposed by students. The Office also assists departments in finding suitable placements for students.

3. *PACE (People Active in Community Effort).* PACE is a student-organized program which provides educationally valuable volunteer community service projects. With funding from the Student Government Association, PACE arranges for transportation to the volunteer site, develops student leadership, and acts as a liaison with the community. PACE's focus is upon fulfilling students' needs through service/learning projects.

Information about all three of these programs may be obtained through the Office of Experiential Learning Programs, Room 1211A Student Union, 4767 or 4938.

Individual Studies Program

WHAT IS INDIVIDUAL STUDIES? Individual Studies is often called the "design your own major" program. It is open to students at UMCP who can, with faculty assistance, design a sequence of formal and/or informal learning experiences, satisfactory completion of which is appropriate for the awarding of a BA or BS degree, and whose educational goals cannot be reasonably achieved within an existing UMCP curriculum. A student who graduates in the program is awarded a degree in Individual Studies, with the name of the individualized major printed on the transcript.

HOW DO I APPLY? You apply by submitting a written prospectus which has the support and approval of a faculty tutor, to the Individual Studies Review Committee. Once the prospectus is approved by the committee, it becomes your "contract" for a degree. It is to the Individual Studies student what the catalog is to other majors.

WHAT ARE THE REQUIREMENTS? Students in the Individual Studies Program must:

1. Complete at least 120 academic credits with a grade point average of "C" or better.
2. Meet the General University Requirements.
3. Include in their program at least 12 hours of formal course work numbered 300 or above, not including the General University Requirements nor IVSP 319 (tutorial report).
4. Include in their program one credit of IVSP 319 (tutorial report) for each semester in which they are full-time students in the program.
5. If the program is 40% or more informal learning experiences (directed studies, internship, research, etc.) the student must complete a three credit Bachelor's paper (IVSP 320). The Bachelor's paper is strongly recommended for all IVSP students.

Admission to the program must be officially approved by the Individual Studies Review Committee, made up of three faculty members, prior to the final thirty semester hours of the proposed curriculum.

WHAT ABOUT CHANGES? The student is free to change into or out of the Individual Studies Program at any time within the limits of the regulations for admission which are listed above. To assure assignment of proper credit for students transferring out of the Individual Studies Program, all work will be graded on a semester-by-semester basis.

Change of tutor may become necessary because of changing staff at the University. Any change in program must be submitted in writing to the Assistant Dean for Undergraduate Studies and approved in order to become part of the student's program.

IS INDIVIDUAL STUDIES AN HONORS PROGRAM? No. ISP is open to any student who wishes to design his or her own major. There is no grade point requirement for admission. The students who are in the program tend to be rather clear about their academic goals, self-motivated, able to work without a lot of direct supervision, and particularly interested in out-of-classroom learning experiences (research, directed studies, internships, etc.).

WHERE DO I START? Students interested in applying to the program should discuss their ideas for a program with Dr. Judith Sorum, Assistant Dean for Undergraduate Studies, Room 1115 Undergraduate Library, X2530/31.

MINORITY STUDENT EDUCATION. The Office of Minority Student Education was officially created on July 1, 1972 as a result of proposals and recommendations submitted to the chancellor from the Campus Black Community and the Study Commission on Student Life. It is responsible for addressing the needs of minority students during their experience at the University of Maryland. This responsibility takes the Office of Minority Student Education through a broad range of concerns, from the introduction of minority students to the University to special supportive programs, with special emphasis on the areas of *recruitment, retention and graduation.*

OMSE seeks to develop a comprehensive *academic articulation* program that will facilitate better utilization of, and linkages with existing University resources. This includes providing minority students with meaningful career advisement in areas that offer both good job opportunities and good salaries. For general program information, contact: Director, Office of Minority Student Education, Room 3151 Undergraduate Library, Phone: 454-4901.

The office is directly responsible for the administration of the Intensive Educational Development Program and Upward Bound, the Equal Opportunity Recruitment Program, and the Nyumburu Community Center.

The following is a brief description of the programs administered by the Office of Minority Student Education.

INTENSIVE EDUCATIONAL DEVELOPMENT. The I.E.D. program developed from a 1968 pilot project for twenty students and has expanded into a broad-based support program enrolling approximately 450 students each year.

The program is designed to serve the marginal academically prepared student who, despite a rich cultural heritage and innate intellectual ability, has been denied access to higher education. I.E.D. focuses on providing programs and services — including tutoring, reading, study skills development, and specially designed curricula and courses that enhance the retention potential for minority, low-income, veterans and new students on the College Park Campus.

During the summer program, I.E.D students who will enter school in the fall take courses in mathematics and English as part of their preparation for the fall semester.

Counseling, tutorial assistance, and other support services are available throughout the academic year to students who are enrolled in the program.

Intensive Educational Development Program, Room 2115, North Administration Building: Phone: 454-4646/4647.

UPWARD BOUND PROGRAM. The University of Maryland Upward Bound Program is designed to provide academic and counseling assistance to capable but underachieving high school students with the purpose of preparing them to pursue some form of post-secondary education. Upward Bound seeks to provide the opportunity for each student to learn skills that will widen his or her educational and cultural perspectives and to discover his or her potential to achieve.

Upward Bound students are selected from high schools in Prince George's and Montgomery Counties, and are recommended to the program through high school principals, teachers, counselors, talent search, social service agencies, and individuals knowledgeable about the program. The academic skills development and counseling services are available to students throughout the school year and during the six-week summer program.

Persons interested in further information regarding Upward Bound Program should contact Director, Room 200, West Education Annex, University of Maryland, College Park, Maryland 20742, Phone: 454-2116.

EQUAL OPPORTUNITY RECRUITMENT PROGRAM. The Equal Opportunity Recruitment Program (EORP) is the minority recruitment unit within the Office of Minority Student Education. Primarily through EORP, the University seeks to achieve a more representative minority student population among blacks, Spanish-speaking, native Americans, and Asian Americans.

After making the admissions decision of student applications, EORP staff aids in processing students with information on financial aid and supportive services. EORP staff will provide any information to students interested in making application. Contact: Equal Opportunity Recruitment Program, Office of Minority Student Education, Room 0107, North Administration Building, Phone: 454-4009.

NYUMBURU COMMUNITY CENTER. Nyumburu (Swahili word meaning "freedom house") Center functions throughout the year to present a wide range of cultural events through a variety of art forms and the humanities. Programs and activities presented by Nyumburu focus on the black experience as it exists in the United States, Caribbean and Africa.

Cultural offerings at Nyumburu include symposia and workshops conducted by visiting artists and scholars in the areas of creative writing and literature, art, music, drama and dance. A Festival of Black Arts, and a Writer's Conference, held annually, highlight specific areas of cultural achievement and contribution by minority peoples.

In cooperation with the Department of Afro-American Studies, Nyumburu is engaged in research projects, such as examining the sources of black creativity and

historical contributions, and the artist's conception of his or her role in the life of the community.

In addition to these activities, Nyumburu Center serves as the host/sponsor of several student clubs and activities.

For information concerning scheduled activities and events contact Nyumburu Community Center, Building CC, University of Maryland, College Park, Maryland 20742; Phone: 454-5774.

General Undergraduate Advisement. The Office of General Undergraduate Advisement is responsible for advising students who are completely undecided as to their choice of major.

This office also serves as a clearing house for information about all curricula and provides students with the opportunity of receiving advisement for curriculum choice.

The Office of General Undergraduate Advisement is located in Room 3151 of the Undergraduate Library. The telephone number is 454-2733.

Academic Advisors. Each student is assigned a faculty advisor whose function is to aid the student in designing his or her program of study.

Special advisors are assigned to students in the pre-professional curricula.

Undergraduate Degree Programs. One major advantage of attending a university campus is the broad range of programs available. This diversity allows the student to change from one major to another without leaving the institution, to choose from a wide spectrum of elective courses, and to benefit from daily contact with students of diverse academic interests and backgrounds.

The undergraduate majors available at the College Park are as follows:

Accounting
Aerospace Engineering
Afro-American Studies
Agricultural Chemistry
Agricultural and Resource Economics
Agricultural Engineering
Agricultural and Extension Education
Agricultural, General
Agronomy
American Studies
Animal Sciences
Anthropology
Architecture
Art History
Art Studio
Astronomy
Biochemistry
Biological Sciences
Botany
Business, General
Chemical Engineering
Chemistry
Civil Engineering
Comparative Literature
Computer Science
Conservation and Resource Development
Cooperative Engineering Program
Dance
Early Childhood and Elementary Education
Economics
Education
Electrical Engineering
Engineering, Undesignated
English
Entomology
Family and Community Development
Finance
Fire Protection
Food, Nutrition and Institutional Administration
Food Science
French
General Studies
Geography
Geology
German
Government and Politics
Health Education
Hearing and Speech Sciences
History
Home Economics Education
Horticulture
Housing and Applied Design
Industrial Education
Industrial Technology
Information Systems Management
Journalism
Kinesiological Sciences
Latin
Library Science Education
Law Enforcement and Criminology
Management Science-Statistics
Marketing
Mathematics
Mechanical Engineering
Microbiology
Music
Personnel and Labor Relations
Philosophy
Production Management
Psychology
Physical Education
Physical Sciences
Physics
Recreation
Russian
Russian Area Studies
Secondary Education
Sociology
Spanish
Special Education
Speech and Dramatic Art
Textiles and Consumer Economics
Transportation
Urban Studies
Zoology

Women's Studies

The Office of Women's Studies was created in January 1974 to encourage and assist departments in developing course offerings in women's studies and in publicizing such courses. The coordinator also advises students wishing to plan individual programs incorporating Women's Studies courses. In cooperation with staff members of McKeldin and the Undergraduate libraries, the Office for Women's Studies encourages acquisition of holdings in this new field of research and helps in publicizing library services to students and faculty working in this field.

The office also maintains liaison with various women's organizations both on- and off-Campus and assists with programs and conferences of particular interest to women. All of these activities are supported by the Advisory Committee on Women's Studies, a policy-making body whose membership includes students, faculty, and library staff.

The office is located at 4102 Foreign Languages Building. Phone: 454-3841.

Special Opportunities

Advanced Placement. Students entering the University from secondary school may obtain advanced placement and college credit on the basis of their performance on the College Board Advanced Placement examinations. These examinations are normally given to eligible high school seniors during the May preceding matriculation in college.

For achievement of a score of five or four on a given examination, the student will be granted Advanced Placement and the credit equivalent of two semester courses in that field; for achievement of a score of three, Advanced Placement and the credit equivalent of either one or two semester courses, depending upon the field of the examination, will be granted. A student earning a score of two on the English Advanced Placement Examination will not need to take English Composition, but no credit will be given.

Credit earned by Advanced Placement may be used to meet major, minor, elective or General University Requirements. The University's program includes the Advanced Placement Examinations in the following areas: biology, chemistry, English, French, German, history, Latin, mathematics, physics and Spanish.

Questions about the program may be addressed to the Director of Admissions and Registrations, or the Dean for Undergraduate Studies. For detailed information about examinations and procedures in taking them, write to Director of Advanced Placement Program, College Entrance Examination Board, 475 Riverside Drive, New York, New York 10027.

Concurrent Undergraduate-Graduate. A senior at the University of Maryland who is within seven hours of completing the requirements for the undergraduate degree may, with the approval of his provost or dean, the chairman of the department concerned, and the Graduate School, register in the undergraduate division for graduate courses, which may later be counted for graduate credit toward an advanced degree at this University. The total of undergraduate and graduate courses must not exceed fifteen credits for the semester. Excess credits in the senior year cannot be used for graduate credit unless proper pre-arrangement is made. Seniors who wish to take advantage of this opportunity must formally apply for admission to the Graduate School.

Honors Programs. A number of unusual opportunities are available to the superior student through the establishment of Honors Programs. Under the Office of the Dean for Undergraduate Studies, a General Honors Program is available to qualified students throughout the Campus. In addition, departmental honors programs are offered to qualified majors in 25 academic departments.

General Honors, as its name suggests, enlarges the breadth of the student's generalized knowledge; Departmental Honors increases the depth of the student's knowledge in his or her major discipline. Both offer the student challenging academic experiences characterized by small sections, active student participation, and an Honors faculty that encourages dialogue. Individually guided research and independent study are important features of Honors work.

Each year a selected group of entering freshmen is invited into the General Honors Program on the basis of high school records and standardized test scores. Students majoring within any department, college, or division are eligible to apply to General Honors.

Departmental Honors Programs ordinarily begin in the junior year, although a few programs begin as early as the freshman year.

The student who completes his Honors curriculum successfully is graduated with a citation in General or Departmental Honors, or with both.

Interested high school students should write to Dr. John Portz, Director, Honors Office, University of Maryland, College Park, Maryland 20742.

Honor Societies. Students who excel in scholarship and leadership may be invited to join the appropriate honor society. These include:

*Alpha Kappa Delta (Sociology)
*Alpha Lambda Delta (Scholarship — Freshman Women)
Alpha Sigma Lambda (Adult Education)
Alpha Zeta (Agriculture)
Beta Alpha Psi (Accounting)
Beta Gamma Sigma (Business and Management)
*Chi Epsilon (Civil Engineering)
Eta Beta Rho (Hebrew)
*Eta Kappa Nu (Electrical Engineering)
Gamma Theta Upsilon (Geography)
Iota Lambda Sigma (Industrial Education)
Kappa Delta Pi (Education)
*Mortar Board (Women's Scholarship and Leadership)
Omicron Delta Epsilon (Economics)
*Omicron Delta Kappa (Men's Scholarship and Leadership)
Omicron Nu (Home Economics)
*Phi Alpha Theta (History)
Phi Beta Kappa (Liberal Arts)
Phi Delta Kappa (Educational)
*Phi Eta Sigma (Scholarship — Freshmen Men)
*Phi Kappa Phi (Senior and Graduate Scholarship)
*Phi Sigma (Biology)
*Phi Sigma Alpha (Political Science)
Phi Sigma Phi (Business and Management)
Pi Alpha Xi (Floriculture)
Pi Mu Epsilon (Mathematics)
*Pi Tau Sigma (Mechanical Engineering)
*Psi Chi (Psychology)
Sigma Alpha Iota (Women's Music)
Sigma Alpha Omicron (Microbiology)
*Sigma Pi Sigma (Physics)
*Tau Beta Pi (Engineering)

*Members of Association of College Honor Societies.

Commencement Honors. Honors for excellence in scholarship are awarded to not more than ten percent (10%) of the graduating class in each degree granting unit. Summa Cum Laude is offered to the highest two percent (2%), Magna Cum Laude to the next three percent (3%), and Cum Laude to the next five percent (5%). To be eligible for this recognition, a total of at least two years of residence (60 semester hours) is required. (The computation does not include grades for courses taken during the last semester of registration before graduation.) No student with an average less than 3.00 will be considered.

Awards and Prizes

Academic Awards

Milton Abramowitz Memorial Prize in Mathematics. A prize is awarded annually to a junior or senior student majoring in mathematics who has demonstrated superior competence and promise for future development in the field of mathematics and its applications.

Agricultural Alumni Award. Presented to a senior who during his or her college career contributed most toward the advancement of the College of Agriculture.

Agricultural Engineering Department's Outstanding Senior Award is presented to a student in Agricultural Engineering on the basis of scholastic performance, participation in ASAE National Student Branch, and other extra-curricular activities.

AIA Medal. Awarded annually by the American Institute of Architects to a graduating student of Architecture for outstanding overall academic achievement.

AIA Certificate. Awarded annually by the American Institute of Architects to a graduating student of Architecture for academic achievement.

Allied Chemical Scholarship Award is presented to a student in Chemical Engineering on the basis of intellectual capacity, scientific ability, breadth of interest and leadership qualities.

Alpha Chi Sigma Award. The Alpha Rho Chapter of the Alpha Chi Sigma Honorary Fraternity offers annually a year's membership in the American Chemical Society to a senior majoring in Chemistry or Chemical Engineering whose average has been above 3.0 for three and one-half years.

Alpha Lambda Delta Award. Presented to the senior member of the group who has maintained the highest average for three and a half years. She must have been in attendance in the institution for the entire time.

Alpha Lambda Delta Senior Certificate Award. Senior members of Alpha Lambda Delta, honorary scholastic society for women, who have maintained an average of 3.5, receive this certificate.

Alpha Rho Chi Medal. Awarded annually by the Alpha Rho Chi fraternity for architecture and the allied professions to a graduating student of architecture who has made a distinctive contribution to school life, embodying the ideals of professional service and leadership.

Alpha Zeta Medal. The Professional Agricultural Fraternity of Alpha Zeta awards annually a medal to the agricultural student in the freshman class who maintains the highest average in academic work.

Alumni Hamilton Award. This award is offered by the Engineering Alumni Chapter to the graduating senior in the College of Engineering who has most successfully combined proficiency in his or her major field of study with achievements — either academic, extra-curricular, or both — in the social sciences or humanities.

American Institute of Aeronautics and Astronautics Award. Free memberships in the Institute for one year and cash prizes for the best paper presented at a Student Branch meeting and for the graduating aeronautical senior with the highest academic standing.

American Institute of Chemical Engineers Award. A certificate, pin and magazine subscription are awarded to the junior member of the Student Chapter who attained the highest overall scholastic average during his or her freshman and sophomore years.

American Institute of Chemical Engineers Award is presented by the National Capital Section to an outstanding sophomore chemical engineering student.

American Institute of Chemical Engineers Professional Achievement Award is presented by the National Capital Section to an outstanding senior chemical engineering student.

American Institute of Chemists Award. Presented for outstanding scholarship in chemistry and for high character.

American Society of Civil Engineers Award. The Maryland Section of the American Society of Civil Engineers awards annually the first year's dues of an associate membership in the Society to a senior member of the Student Chapter on recommendation of the faculty of the Department of Civil Engineering.

American Society of Mechanical Engineers Senior Award. Presented to the senior member who has contributed most to the local chapter.

American Society for Testing Materials. Two student awards are given annually to engineering seniors in recognition of superior scholastic ability and demonstrated interest in engineering materials and their evaluation.

Appleman-Norton Award in Botany to a senior major in Botany who is considered worthy on the basis of demonstrated ability and excellence in scholarship.

Awards for Excellence in Teaching Spanish. Presented by the Department of Spanish and Portuguese to the three graduate assistants who have most distinguished themselves by the excellence of their teaching.

Awards for Excellence in the Study of Spanish. Presented by the Department of Spanish and Portuguese to the three members of the graduating class who have most distinguished themselves as students of Spanish language and literature.

David Arthur Berman Memorial Award is presented to two students majoring in Chemical Engineering with the highest cumulative scholastic averages at the end of the first semester of their junior year and who have been elected to Tau Beta Pi.

Dinah Berman Memorial Medal. The Dinah Berman Memorial Medal is awarded annually to the sophomore who has attained the highest scholastic average of his or her class in the College of Engineering. This medal is given by Mr. Benjamin Berman.

B'nai B'rith Award. The B'nai B'rith Women of Prince George's County present a Book Award for Excellence in Hebrew Studies.

The Donald T. Bonney Honors Award is presented to the Chemical Engineering student who has made the most outstanding contribution to the profession as a member of the Honors Society, Omega Chi Epsilon.

Business Education Award of Merit to a student in Business Education in recognition of outstanding achievement as a student.

Citizenship Prize For Men. An award presented annually as a memorial to the late President Emeritus H. C. Byrd to that male member of the senior class who during his collegiate career most nearly typified the model citizen and has contributed significantly to the general advancement of the interests of the University.

Citizenship Prize For Women. An award presented annually as a memorial to Sally Sterling Byrd to that female member of the senior class who during her collegiate career has most nearly typified the model citizen and has contributed significantly to the general advancement of the interests of the University.

CRC Engineering Science Achievement Award is presented to a junior in the College of Engineering for outstanding scholarship, leadership, and service.

Bernard L. Crozier Award. The Maryland Association of Engineers awards a cash prize of twenty-five dollars to the senior in the College of Engineering who, in the opinion of the faculty, has made the greatest improvement in scholarship during his stay at the University.

Delta Delta Delta Medal. This sorority awards a medal annually to the woman who attains the highest average in academic work during the sophomore year.

Delta Gamma Scholarship Award. This award is offered to the woman member of the graduating class who has maintained the highest average during three and one-half years at the University.

Delta Sigma Pi Scholarship Key. This award is offered to a member of the graduating class who has maintained the highest scholastic average for the entire four-year course in the College of Business and Management.

Distinguished Accounting Student Awards. Awarded by the University of Maryland chapter of Beta Alpha Psi and the accounting faculty to the ten senior accounting students with the highest scholastic average in Accounting in the College of Business and Management.

Nathan L. Drake Award. Presented by the Alpha Rho Chapter of Alpha Chi Sigma to the most promising student who is majoring in chemistry and has completed the sophomore year.

Education Alumni Award. Presented to the outstanding senior man and senior woman in the College of Education.

Electrical Engineering Undergraduate Association Award is presented to an undergraduate in Electrical Engineering in recognition of outstanding service and leadership.

Engineering Alumni Chapter Award is presented to a senior in the College of Engineering for outstanding scholarship and service to the College of Engineering.

Eta Kappa Nu Outstanding Senior Award is presented to a senior in Electrical Engineering for outstanding scholastic achievement and service to the society and department.

Wesley Gewehr Award. Phi Alpha Theta, History honorary, offers a cash award each year for the best undergraduate paper and the best graduate paper written on an historical topic. The entrance paper must

be recommended by the history faculty of the University of Maryland.

Forbes Chocolate Leadership Award of Cleveland, Ohio, presents a $100 leadership award to a major in Food Science.

Goddard Medal. The James Douglas Goddard Memorial Medal is awarded annually to the male resident of Prince George's County born therein, who makes the highest average in his studies and who at the same time embodies the most manly attributes. The medal is given by Mrs. Anne G. Goddard James of Washington, D.C.

Charles B. Hale Dramatic Awards. The University Theatre recognizes annually the man and woman members of the senior class who have done most for the advancement of dramatics at the University.

Robert Half Personnel Accounting and Tax Award. Two awards of $100 each to outstanding students majoring in Accounting in the College of Business and Management.

P. Arne Hansen Memorial Award. Presented to the Outstanding Departmental Honors Student in Microbiology.

The Haskins and Sells Foundations, Inc. Award to the senior student in the College of Business and Management concentrating in accounting who has demonstrated excellent ability in this field of study.

William Randolph Hearst Foundation Awards. Categories: general news, features, editorials, investigative reporting, spot news.

Robert M. Higginbotham Memorial Award. Award to an outstanding junior student majoring in Mathematics.

Home Economics Alumni Award. Presented to the female student outstanding in application of home economics in her present living and who shows promise of carrying these into her future home and community.

Institute of Electrical and Electronics Engineering Award. The Washington Section of the Institute of Electrical and Electronics Engineers defrays the expenses of a year's membership as an associate in the institute for the senior doing the most to promote student branch activities.

Joe Elbert James Memorial Award. Gold watch annually awarded to the graduating senior in horticulture on basis of scholarship and promise of future achievement.

Charles Manning Prize in Creative Arts. Awarded annually to a University of Maryland student for achievement in the creative or performing arts.

Maryland-Delaware Press Association Annual Citation. Presented to the outstanding senior in journalism.

Maryland Recreation and Parks Society Award to outstanding senior majoring in recreation.

The Men's League Award to the male senior who gave the most to sports.

Men's League Certificates. Offered for outstanding achievement, character and service to the University.

Men's League Cup. This award is offered by the Men's League to the graduating male senior who has done the most for the male student body.

Motor Fleet Supervisors Award to a student majoring in transportation in the College of Business and Management.

National Society of Fire Protection Engineers Awards. Presented to the most outstanding senior and sophomore in the fire protection curriculum.

Omicron Nu Sorority Medal. This honorary society awards a medal annually to the freshman woman in the College of Home Economics who attains the highest scholastic average during the first semester.

L. W. Parker Memorial Award. Presented annually to a graduating student of Architecture for outstanding architectural craftsmanship.

Phi Beta Kappa Junior Award. An award to be presented to the junior initiate into Phi Beta Kappa who has attained the highest academic average.

Phi Beta Kappa — Leon P. Smith Award. The award of the Gamma of Maryland Chapter of Phi Beta Kappa is presented to the initiate senior with the highest cumulative scholastic average whose basic course program has been in the liberal studies.

Phi Chi Theta Key. The Phi Chi Theta Key is awarded to the outstanding graduating senior woman in the College of Business and Management on the basis of scholarship, activities and leadership.

Phi Sigma Awards for outstanding achievement in biological sciences to an undergraduate student and a graduate student.

Pi Tau Sigma Outstanding Sophomore Award. Presented to the most outstanding sophomore in Mechanical Engineering on the basis of scholastic average and instructors' ratings.

Pi Tau Sigma Memorial Award. Presented to the senior in Mechanical Engineering who has made the most outstanding contribution to the University.

Pilot Freight Carriers, Inc. Award to the senior student in the College of Business and Management who has majored in transportation and who has demonstrated competence in this field of study.

Public Relations Society of America. The Baltimore Chapter of PRSA presents an annual citation to the outstanding senior majoring in public relations.

Sigma Alpha Omicron Award. This award is presented to a senior student majoring in microbiology for high scholarship, character and leadership.

Sigma Delta Chi Citation. For Achievement at the University of Maryland.

Sigma Delta Pi Award. Presented by the Department of Spanish and Portuguese to the graduating member of Sigma Delta Pi (National Spanish Honor Society) who has rendered the greatest service to the Delta (University of Maryland) Chapter.

Dr. Leo and Rita Sklar General Honors Awards. Dr. Leo Sklar, A&S '37, and his wife, Rita Sklar, annually fund awards for excellence in the General Honors Program. These awards are given to outstanding students in the General Honors Program.

Algernon Sydney Sullivan Award. The New York Southern Society, in memory of its first president, awards annually medallions and certificates to one man and one woman in the graduating class and one non-student who evince in their daily life a spirit of love for and helpfulness to other men and women.

Tau Beta Pi Sophomore Improvement Award is presented to the junior in the College of Engineering who during the sophomore year has made the greatest percentage of possible improvement in scholarship over that of his or her freshman year.

Tau Beta Pi Award. The Maryland Beta Chapter of Tau Beta Pi Association, national engineering honor society, awards an engineer's handbook to the junior in the College of Engineering who during his or her sophomore year has made the greatest improvement in scholarship over that of his or her freshman year.

The Homer Ulrich Award. The Homer Ulrich Honors Awards in Performance are presented each spring in honor of Homer Ulrich, Professor Emeritus and former Chairman of the Music Department. Three undergraduate and three graduate performers are selected in a departmental competition to appear in a specially designated honors recital and to receive an honorarium.

Wall Street Journal Achievement Award. An award to the outstanding student in investments and security analysis.

Wall Street Journal Student Achievement Award. Awarded annually to the graduating senior who has maintained the highest scholastic achievement in the field of financial administration. The award consists of a silver medal embedded in clear plastic and one year's subscription to the *Wall Street Journal*.

James P. Wharton Art Award Fund. This fund was endowed by the former head of the Art Department, Colonel James P. Wharton. An annual award of $200.00 is given to a senior for special achievement in Studio Art.

Air Force ROTC Awards

Aerospace Education Foundation W. Randolph Lovelace Memorial Award. Recognizes the most outstanding Air Force Association Award winner from each of the nine geographical areas.

Air Force Association Award to the outstanding senior cadet who has excelled in Field Training, possesses individual leadership characteristics, ranks in the upper 10% of his or her class in the University and the upper 5% of his or her ROTC class, and has outstanding promotion potential.

Alumni Cup presented to the second semester Air Science senior cadet who has achieved the highest cumulative grade point average within the Corps of Cadets.

American Defense Preparedness Association Award. Presented to the outstanding Senior Cadet who has an academic average which places him or her in the upper half of his or her entire class at the University, has received no grade in the advanced ROTC courses less than B, is in upper 20% of total ROTC enrollment at the University of Maryland, has participated actively in athletics and/or campus activities, and has demonstrated outstanding leadership qualities.

American Fighter Aces Award recognizes the outstanding graduating cadet pilot in each geographical area based on his or her performance and achievements as an AFROTC cadet and his or her performance in the Flight Instruction Program.

American Legion ROTC General Military Excellence Awards to a senior (Gold Award) and a junior (Silver Award) in the upper 25% of his or her AFROTC class demonstrating outstanding qualities in military leadership, discipline, and character.

American Legion ROTC Scholastic Award to an outstanding senior (Gold Award) and junior (Silver Award) who are in the upper 10% of their class in the University and upper 25% of their AFROTC class, and who have demonstrated high qualities in military leadership.

Angel Flight Freshman Award to the distinctive freshman cadet in the General Military Course.

Armed Forces Communications and Electronics Association Award to the outstanding senior cadet who is preparing for a career in this technical area and has demonstrated outstanding qualities of military leadership, high moral character, and definite aptitude for military service.

Armed Forces Communications and Electronics Association Scholarship Award of one $500 scholarship annually to a sophomore AFROTC cadet for undergraduate or University study in electrical engineering, communications engineering and/or technical photography.

Arnold Air Society GMC Cadet Award to the freshman or sophomore cadet who has demonstrated outstanding quality in areas of attitude, personal appearance, and military knowledge.

Coblentz Memorial Cup to the commander of the best drilled Flight within the Corps of Cadets.

Commandant of Cadets Award to the senior cadet whose increased officership potential has been significantly reflected in a Cadet Corps activity under his management.

Daughters of Founders and Patriots of America Award to a qualified sophomore cadet who has demonstrated qualities of dependability, good character, adherence to military discipline, leadership potential, patriotism, and an understanding of the importance of the American Heritage.

Daughters of The American Revolution Award to the senior cadet who has demonstrated high qualities of dependability, good character, adherence to military discipline, and leadership ability.

Disabled American Veterans Cup to the senior cadet who has displayed outstanding leadership, scholarship, and citizenship.

General Dynamics AFROTC Cadet Award to the sophomore cadet who has demonstrated outstanding leadership qualities and who possesses a positive attitude, good personal appearance, high personal attributes, military courtesy, and high officer potential.

George M. Reiley Award to the member of the Flight Instruction Program showing the highest aptitude for flying as demonstrated by his or her performance in the program.

Governor's Cup to the one cadet chosen as Cadet of the year in competition with all other cadets in the Corps within the Corps of Cadets.

Legion of Valor Bronze Cross of Achievement Award recognizes one cadet from each geographical area for his performance and achievements as an AFROTC cadet.

Military Order of World Wars Award to the Aerospace Studies cadet(s) recognized as the most improved within his year category (freshman, sophomore, junior or senior).

National Defense Transportation Association Award to the outstanding senior cadet majoring in transportation.

National Sojourners Award to an outstanding sophomore or junior cadet who has contributed the most to encourage and demonstrate Americanism within the Corps of Cadets and on the Campus.

Professor of Aerospace Studies Award to the senior cadet who has distinguished himself through excellence of leadership in the Corps of Cadets.

Reserve Officers Association Awards to the senior cadet (Gold Award) and junior cadet (Silver Award), demonstrating outstanding academic achievement in AFROTC subject matter and highest officer potential. Ribbons of merit are presented to members of the freshman and sophomore classes.

Society of American Military Engineers Award to recognize 20 junior or senior cadets nationally displaying outstanding scholastic achievement and leadership and majoring in the field of engineering.

Sons of The American Revolution Award to a junior cadet in the Two-Year Program or a freshman cadet in the Four-Year Program who has shown a high degree of merit in his leadership qualities, soldierly bearing and all around excellence in the AFROTC program studies and activities.

Sun Newspaper Award to the best drilled sophomore cadet in the Corps of Cadets.

Athletic Awards

Atlantic Coast Conference Award. A plaque is awarded each year to a senior in each conference school for excellence in scholarship and athletics.

The Alvin L. Aubinoe Basketball Trophy. This trophy is given in memory of Alvin L. Aubinoe for the senior who has contributed most to the squad.

The Alvin L. Aubinoe Football Trophy. This trophy is given in memory of Alvin L. Aubinoe for the unsung hero of the current season.

The Alvin L. Aubinoe Track Trophy. This trophy is given in memory of Alvin L. Aubinoe for the senior who has contributed most to the squad during the time the student was on the squad.

Bob Beall-Tommy Marcos Trophy. This trophy is awarded to the best football lineman of the year.

John T. Bell Swimming Award. To the year's outstanding swimmer or diver.

Louis W. Berger Trophy. Presented to the outstanding senior baseball player.

Andrew M. Cohen Tennis Trophy. This trophy is awarded to the member of the tennis team who, judged by members of the team, contributed the most to tennis.

William P. Cole, III, Memorial Lacrosse Award. This award, offered by the teammates of William P. Cole, III, and the coaches of the 1940 National Champion team, is presented to the outstanding midfielder.

The George C. Cook Memorial Scholarship Trophy. Awarded annually to a member of the football team with the highest scholastic average.

Joe Deckman-Sam Silver Trophy. This trophy is offered by Joseph H. Decker and Samuel L. Silver to the most improved defense lacrosse player.

Geary F. Eppley Award. Offered by Benny and Hotsy Alperstein to the graduating male senior athlete who during his three years of varsity competition, lettered at least once and attained the highest over-all scholastic average.

Halbert K. Evans Memorial Track Award. This award, given in memory of "Hermie" Evans, of the Class of 1940, by his friends, is presented to a graduating member of the track team.

Jack Faber-Al Heagy Unsung Hero Award. Presented to the player who best exemplifies determination, will to win, and pride in accomplishment.

Tom Fields Award. This award is given to the most important member of the Cross Country team based on the qualities of leadership, dedication to excellence, attitude, and personal achievement.

Herbert H. Goodman Memorial Trophy. This trophy is awarded to the most outstanding wrestler of the year.

Jim Kehoe Ring Award. A Maryland Ring is awarded to the member of the track team whose dedication to excellence most closely exemplifies that of Jim Kehoe, one of Maryland's greatest trackmen.

Charles Leroy Mackert Trophy. This trophy is offered by William K. Krouse to the Maryland student who has contributed most to wrestling while at the University.

Maryland Ring. The Maryland Ring is offered as a memorial to Charles L. Linhardt, of the Class of 1912, to the Maryland man who is adjudged the best athlete of the year.

Charles P. McCormick Trophy. This trophy is given in memory of Charles P. McCormick to the senior member of the swimming team who has contributed most to swimming during the swimmer's collegiate career.

Edwin Powell Trophy. This trophy is offered by the Class of 1913 to the player who has rendered the greatest service to lacrosse during the year.

Silvester Watch for Excellence in Athletics. A gold watch, given in honor of former President of the University, R. W. Silvester, is offered annually to "the man who typifies the best in college athletics."

TEKE Trophy. This trophy is offered by the Maryland Chapter of Tau Kappa Epsilon Fraternity to the student who during four years at the University has rendered the greatest service to football.

Robert E. Theofeld Memorial. This trophy is presented by Dr. and Mrs. Harry S. Hoffman and is awarded to the golfer who most nearly exemplifies the competitive spirit and strong character of Robert E. Theofeld, a former member of the boxing team.

The Dr. Reginald Van Trump Truitt Award. This award is given to a senior attackman in lacrosse (midfield or attack) for scholastic attainments and team performance.

University of Maryland Swimming Association Scholar Athlete Award. This award is given to the swimmer who has compiled the best combination academic and aquatic record.

Music Awards

Director's Award to the outstanding member of the Marching Band.

Band Alumni Award to one who has demonstrated outstanding leadership in the Marching Band.

Composition Prize to the outstanding student composition of the year.

Homer Ulrich Performance Awards. Undergraduate: Piano, Voice, Instruments. Graduate: Piano, Voice, Instruments.

Kappa Kappa Psi Award to the most outstanding band member of the year.

Sigma Alpha Iota Alumnae Award for outstanding musical performance.

Sigma Alpha Iota Dean's Honor Award for service and dedication.

Sigma Alpha Iota Honor Certificate to the senior with the highest scholastic average.

Sigma Alpha Iota Leadership Award based on personality, student activities, fraternity service, and scholarship.

Tau Beta Sigma Award to the outstanding band sorority member of the year.

Student Government Awards

Certificates of Appreciation are awarded to the members of the S.G.A. legislature and Keys to the members of the Cabinet.

Student Data Information

Policy of the University of Maryland on Access to and Release of Student Data/Information

General Statement. The University of Maryland has the responsibility for effectively supervising any access to and/or release of official data/information about its students. Certain items of information about individual students are fundamental to the educational process and must be recorded. This recorded information concerning students must be used only for clearly-defined purposes, must be safeguarded and controlled to avoid violations of personal privacy, and must be appropriately disposed of when the justification for its collection and retention no longer exists.

In this regard, the University is committed to protecting to the maximum extent possible the right of privacy of all individuals about whom it holds information, records and files. Access to and release of such records is restricted to the student concerned, to others with the student's written consent, to officials within the University, to a court of competent jurisdiction and otherwise pursuant to law.

Access. All official information collected and maintained in the University identifiable with an individual student will be made available for inspection and review at the written request of that student subject to certain exceptions.

For purposes of access to records at the University of Maryland, a student enrolled (or formerly enrolled) for academic credit or audit at any campus of the University shall have access to official records concerning him on any campus on which he is or has been enrolled.

The personal files of members of the faculty and staff which concern students, including private correspondence, and notes which refer to students, are *not* regarded as official records of the University. This includes notes intended for the personal use of the faculty and never intended to be official records of the University.

A request for general access to all official records, files and data maintained by a campus, must be made in writing to the coordinator of records or to other person(s) as designated by the chancellor at that particular campus. A request for access to official data maintained in a particular office may be made to the administrative head of that office.

When a student (or former student) appears at a given office and requests access to the University records about himself,

1. The student must provide proper identification verifying that he is the person whose record is being accessed.
2. The designated staff person(s) must supervise the review of the contents of the record with the student.
3. Inspection and review shall be permitted within a period not to exceed 45 days from the date of the student's request.

4. The student will be free to make notes concerning the contents but no material will be removed from the record at the time.

Under normal circumstances, the student is entitled to receive a copy only of his permanent academic record. A reasonable administrative fee may be charged for providing copies of this or other items.

Record keeping personnel and members of the faculty and staff with administrative assignments may have access to records and files for internal educational purposes as well as for routinely necessary clerical, administrative and statistical purposes as required by the duties of their jobs. The name and position of the official responsible for the maintenance of each type of educational record may be obtained from the coordinator of records or other person appointed by the chancellor on each campus.

Any other access allowed by law must be recorded showing the legitimate educational or other purpose and the signature of the person gaining access. The student concerned shall be entitled to review this information.

Release of Information. Except with the prior written consent of the student (or former student) concerned, or as required by federal and state law, no information in any student file may be released to any individual (including parents, spouse, or other students) or organization with the exception of information defined as "Public Information."

When disclosure of any personally identifiable data/information from University records about a student is demanded pursuant to court order or lawfully issued subpoena, the staff member receiving such order shall immediately notify the student concerned in writing prior to compliance with such order or subpoena.

Data/information from University records about students will be released for approved research purposes only if the identity of the student involved is fully protected.

A record will be kept of all such releases.

Information from University records may be released to appropriate persons in connection with an emergency if the knowledge of such information is necessary to protect the health or safety of a student or other persons.

Public Information. The following items are considered public data/information and may be disclosed by the University in response to inquiries concerning individual students, whether the inquiries are in person, in writing or over the telephone.

1. Name
2. Affirmation of whether currently enrolled
3. Campus location

Unless the student has officially filed a request with the campus registrar that disclosure not be made without his written permission, the following items in addition to those above are considered public information and may be included in appropriate University/campus directories and publications and may be disclosed by designated staff members on each campus in response to inquiries concerning individual students, whether the inquiries are in person, in writing, or over the telephone.

1. School, college, department, major or division
2. Dates of enrollment
3. Degrees received
4. Honors received
5. Local address and phone number
6. Home address (permanent)
7. Participation in officially recognized activities and sports.
8. Weight and height of members of athletic teams

The release of public information as described above may be limited by an individual campus policy.

Letters of Appraisal. Candid appraisals and evaluations of performance and potential are an essential part of the educational process. Clearly, the provision of such information to prospective employers, to other educational institutions, or to other legitimately concerned outside individuals and agencies is necessary and in the interest of the particular student.

Data/information which was part of University records prior to January 1, 1975 and which was collected and maintained as confidential information, will not be disclosed to students. Should a student desire access to a confidential letter of appraisal received prior to January 1, 1975, the student shall be advised to have the writer of that appraisal notify, in writing, the concerned records custodian of the decision as to whether or not the writer is willing to have the appraisal made available for the student's review. Unless a written response is received approving a change of status in the letter, the treatment of the letter as a confidential document shall continue.

Documents of appraisal relating to students collected by the University or any department or office of the University on or after January 1, 1975 will be maintained confidentially only if a waiver of the right of access has been executed by the student. In the absence of such a waiver, all such documents will be available for student inspection and review.

All references, recommendations, evaluations and other written notations or comments, originated prior to January 1, 1975, where the author by reason of custom, common practice, or specific assurance thought or had good reason to believe that such documents or materials would be confidential, will be maintained as confidential, unless the author consents in writing to waive such confidentiality.

If a student files a written waiver with the department or office concerned, letters of appraisal received pursuant to that waiver will be maintained confidentially. Forms will be available for this purpose.

Challenges to the Record. Every student shall have the opportunity to challenge any item in his file which he considers to be inaccurate, misleading or otherwise inappropriate data. A student shall initiate a challenge by submitting a request in writing for the deletion or correction of the particular item. The request shall be made to the custodian of the particular record in question.

If the custodian and the student involved are unable to resolve the matter to the satisfaction of both parties, the written request for deletion or correction shall be submitted by the student to the coordinator of records, or other such person as designated by the chancellor, who shall serve as the hearing officer. The student shall be given the opportunity for a hearing, at which the student may present oral or written justification for the request for deletion or correction. The hearing officer may obtain such other information as he deems appropriate for use in the hearing and shall give the student a written decision on the matter within thirty (30) days from the conclusion of the hearing. If the decision of the hearing officer is to deny the deletion or correction of an item in the student's file, the student shall be entitled to submit a written statement to the hearing officer presenting his position with regard to the item. Both the written decision of the hearing officer and the statement submitted by the student shall be inserted in the student's file. The decision of the hearing officer shall be final.

Grades may be challenged under this procedure only on the basis of the accuracy of their transcription.

Exceptions to the Policy. It is the position of the University that certain data/information maintained in various offices of the University is not subject to the provisions of this policy with regard to inspection, review, challenge, correction or deletion.

(a) Statements submitted by parent/guardian or spouse in support of financial aid or residency determinations are considered to be confidential between those persons and the University, and are not subject to the provisions of this policy except

with the written consent of the persons involved. Such documents are *not* regarded as part of the student's official record.

(b) University employment records of students are not included in this policy, except as provided under Article 76A of the Annotated Code of Maryland

(c) With regard to general health data, only that data/information which is used by the University in making a decision regarding the student's status is subject to review by the student under this policy. Written psychiatric or psychological case notes which form the basis for diagnoses, recommendations, or treatment plans remain privileged information not accessible to the student. Such case notes are not considered to be part of official University records. To ensure the availability of correct and helpful interpretations of any psychological test scores, notes or other evaluative or medical materials, the contents of these files for an individual student may be reviewed by that student only in consultation with a professional staff member of the specific department involved.

(d) Records relating to a continuing or active investigation by the campus security office, or records of said office not relating to the student's status with the University are not subject to this policy.

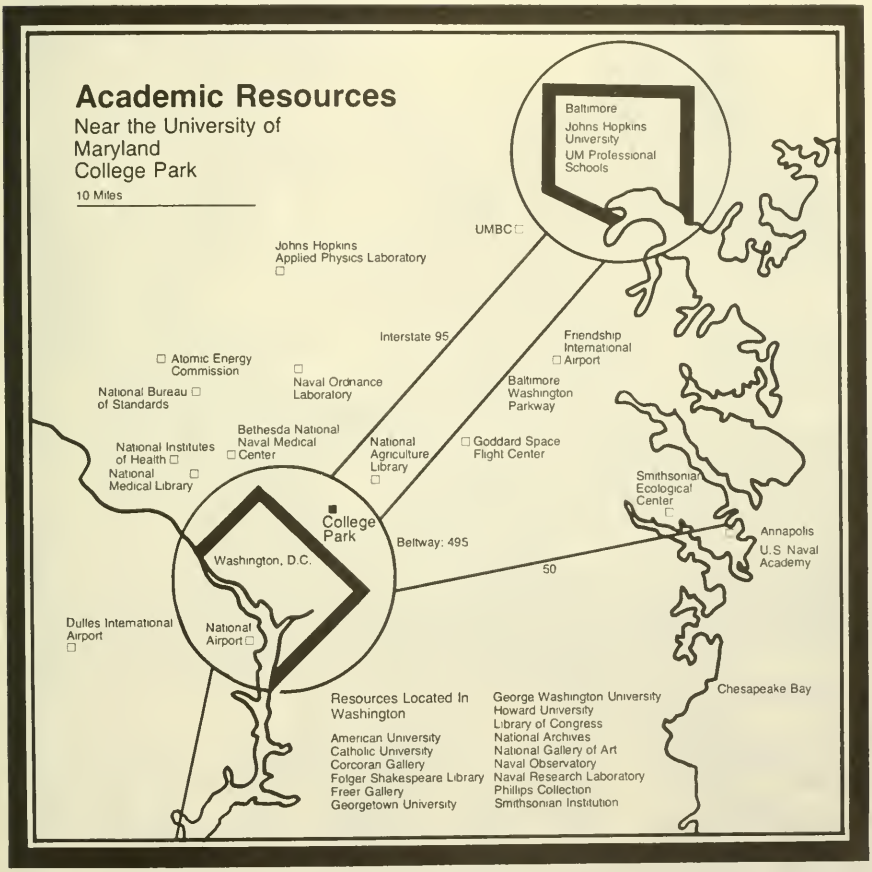
(e) No student is entitled to see information or records that pertain to another student, to parents, or to other third parties. A student is entitled to review only that portion of an official record or file that pertains to him or her.

Notice: Notice of these policies and procedures will be published by the University

The foregoing statement of University policy becomes effective immediately, but should be regarded as tentative pending the issuance of federal regulations and guidelines or amendments in the applicable laws.

The masculine gender of personal pronouns in this document includes the feminine gender.

Approved by the President's Administrative Council, 2/3/75.



Academic Divisions, Colleges, Schools, and Departments

3

Division of Agricultural and Life Sciences

The Division of Agricultural and Life Sciences offers educational opportunities for students in subject matter relating to living organisms and their interaction with one another and with the environment. Education in all aspects of agriculture is included. Programs of study include those involving the most fundamental concepts of biological science and chemistry and the use of knowledge in daily life as well as the application of economic and engineering principles in planning the improvement of life. In addition to pursuing the baccalaureate degree, a number of students in this Division engage in pre-professional education in such fields as Pre-Medicine, Pre-Dentistry, and Pre-Veterinary Medicine.

The student may obtain a Bachelor of Science Degree with a major in any of the departments and curricula listed. Students in pre-professional programs may, under certain circumstances, obtain a B.S. degree following three years on Campus and one successful year in a professional school.

Structure of the Division. The Division of Agricultural and Life Sciences includes the following departments and programs:

1. Within the College of Agriculture.
   a. Departments: Agricultural Engineering, Agricultural and Extension Education, Agricultural and Resource Economics, Agronomy, Animal Science, Dairy Science, Horticulture, Poultry Science, and Veterinary Science.
   b. Programs or Curricula: Agricultural Chemistry, Animal Sciences, Conservation and Resource Development, Food Science, General Agriculture, Pre-Forestry, Pre-Theology, and Pre-Veterinary Medicine.
   c. Institute of Applied Agriculture.
2. Divisional Units — Non-College.
   a. Departments: Botany, Chemistry, Entomology, Geology, Microbiology, Zoology.
   b. Programs or Curricula: General Biological Sciences, Pre-Dentistry, Pre-Optometry, and Pre-Medicine.

Admission. Requirements for admission to the Division are the same as those for admission to the other units of the University. Application must be made to the Director of Admissions, University of Maryland, College Park, Maryland.

Students desiring a program of study in the Division of Agricultural and Life Sciences should include the following subjects in their high school program: English, four units; college preparatory mathematics (algebra, plane geometry), three or four units; biology, chemistry, or physics, two units; history and social sciences, one or more units.

Students wishing to major in chemistry, botany, microbiology, or zoology, or to follow a pre-medical or pre-dental program, should include four units of college preparatory mathematics (algebra, plane geometry, trigonometry, and more advanced mathematics, if available). They should also include chemistry and physics.

Each entering student in this Division will be assigned a faculty advisor who will help select a course program designed to meet his/her goals and objectives. As soon as a student selects a major field of study an advisor representing that department or program will be assigned.

Students following pre-professional programs will be advised by knowledgeable individuals.

In addition to the educational resources on the Campus, students with specific interests have an opportunity to utilize libraries and other resources of the several government agencies located close to the Campus. Research laboratories related to agriculture or marine biology are available to students with special interests.

Degree Requirements. Students graduating from the Division must complete at least 120 credits with an average of 2.0 in all courses applicable towards the degree. Included in the 120 credits must be:

1. General University Requirements (30 credits)
2. Division Requirements:
   a. Chemistry: Any one course of three or more credits in chemistry numbered 102 or higher;
   b. Mathematics: Any one course of three or more credits in mathematics numbered 100 or higher;
   c. Biological Sciences: Any one course carrying three or more credits selected from offerings of the Departments of Botany, Entomology, Microbiology or Zoology, or any interdepartmental course approved for this purpose by the Division (e.g., ALSC 101).
3. Requirements of the major and supporting areas, which are listed under individual program headings.

Honors Programs. Students may apply for admission to the honors programs of Agricultural and Resource Economics, Botany, Chemistry, Microbiology, and Zoology.

On the basis of the student's performance during participation in the Honors Program, the department may recommend the candidate for the appropriate degree with (departmental) honors, or for the appropriate degree with (departmental) high honors. Successful completion of the Honors Program will be recognized by a citation in the Commencement Program and by an appropriate entry on the student's record and diploma.

College of Agriculture

The College of Agriculture offers educational programs with a broad cultural and scientific base. Students are prepared for careers in agriculturally related sciences, technology and business.

The application of knowledge to the solution of some

of man's most critical problems concerning adequate amounts and quality of food, and the quality of the environment in which he lives, are important missions of the College.

This original College of the University of Maryland at College Park was chartered in 1856. The College of Agriculture has a continuous record of leadership in education since that date. It became the beneficiary of the Land-Grant Act of 1862.

The College of Agriculture continues to grow and develop as part of the greater University, providing education and research activities enabling man to use his environment and natural resources to best advantage while conserving basic resources for future generations.

Advantages of Location and Facilities. Educational opportunities in the College of Agriculture are enhanced by the nearby location of several research units of the federal government. Of particular interest is the Agricultural Research Center at Beltsville and the U.S. Department of Agriculture Headquarters in Washington, D.C. The National Agricultural Library at Beltsville is an important resource.

Related research laboratories of the National Institutes of Health, military hospitals, National Aeronautics and Space Agency, and the National Bureau of Standards are in the vicinity. Interaction of faculty and students with personnel from these agencies is encouraged. Teaching and research activities are conducted with the cooperation of scientists and professional people in government positions.

Instruction in the basic biological and physical sciences, social sciences and engineering principles is conducted in well-designed classrooms and laboratories. The application of basic principles to practical situations is demonstrated for the student in numerous ways.

Modern greenhouses are available for breeding and propagation of a wide variety of plants, work on the control of weeds and improved cultural practices.

Herds of dairy and beef cattle and flocks of poultry are kept on the Campus for teaching and research purposes.

Several operating research farms, located in central Maryland, southern Maryland and on the Eastern Shore, support the educational programs in Agriculture by providing locations where important crops, animals and poultry can be grown and maintained under practical and research conditions. These farms add an important dimension to the courses offered in Agriculture. Data from these operations and from cooperating producers and processors of agricultural products are utilized by students interested in economics, teaching, engineering, and conservation, as they relate to agriculture, as well as by those concerned with biology or management of agricultural crops and animals.

General Information. The College of Agriculture offers a variety of four year programs leading to the Bachelor of Science degree.

Today's agriculture is a highly complex and extremely efficient industry which includes supplies and services used in agricultural production, the production process, and the marketing, processing and distribution of products to meet the consumers' needs and wants.

Instruction in the College of Agriculture includes the fundamental sciences and emphasizes the precise knowledge that its graduates must employ in the industrialized agriculture of today, and helps develop the foundation for their role in the future. Course programs in specialized areas may be tailored to fit the particular needs of the individual student.

Previous training in agriculture is not a prerequisite for study in the College of Agriculture. Careers for men and women with rural, suburban or urban backgrounds are available in agriculture and its allied industries.

Graduates of the College of Agriculture have an adequate educational background for careers and continued learning after college in business, production, teaching, research, extension, and many other professional fields.

Requirements for Admission. Admission requirements to the College of Agriculture are the same as those of the University.

For students entering the College of Agriculture it is recommended that their high school preparatory courses include English, 4 units; mathematics, 3 units; biological and physical sciences, 3 units; and history or social sciences, 2 units. Four units of mathematics should be elected by students who plan to major in agricultural engineering or agricultural chemistry.

Requirements for Graduation. Each student must complete at least 120 credit hours in academic subjects with a minimum grade point average of 2.0 (C).

Honors Program. An Honors Program is approved for majors in Agricultural and Resource Economics. The objective of the Honors Program is to recognize superior scholarship and to provide opportunity for the excellent student to broaden his or her perspective and to increase the depth of his or her studies.

The programs in Honors are administered by Departmental Honors Committees and supervised by the College Committee on Honors. Students in the College of Agriculture, who are in the top 20 percent of their class at the end of their first year may be considered for admission into the Honors Program. Of this group up to 50 percent may be admitted.

Sophomores or first semester Juniors will be considered upon application from those students in the upper 20 percent of their class. While application may be made until the student enters the sixth semester, early entrance into the program is recommended. Students admitted to the program enjoy certain academic privileges.

Faculty Advisement. Each student in the College of Agriculture is assigned to a faculty advisor. Advisors normally work with a limited number of students and are able to give individual guidance.

Students entering the freshman year with a definite choice of curriculum are assigned to departmental advisors for counsel and planning of all academic programs. Students who have not selected a definite curriculum, are assigned to a general advisor who assists with the choice of electives and acquaints students with opportunities in the curriculums in the College of Agriculture and in other divisions of the University.

Scholarships. A number of scholarships are available for students enrolled in the College of Agriculture. These include awards by the Agricultural Development Fund, Bayshore Foods, Inc., Capitol Milk Producers Cooperative, Inc., Dairy Technology Society of Maryland and the District of Columbia, Delaware-Maryland Plant Food Association, Inc., Dr. Ernest N. Cory Trust Fund, Danforth Foundation, Frederick County Holstein Association, The Staley and Eugene Hahn Memorial Scholarship Fund, Hyattsville Horticultural Society, Inter-State Milk Producers, The Kinghorne Fund, Lindback Foundation, Maryland Cooperative Milk Producers, Inc., Maryland Electrification Council, Maryland Holstein Association, Maryland Turfgrass Association, Maryland State Golf Association, Maryland and Virginia Milk Producers, Inc., Maryland Veterinarians, Dr. Ray A. Murray Scholarship Fund, Ralston Purina Company, The Schluderberg Foundation, Southern States Cooperative, Inc., The Leander F. Stuart Memorial Fund, the Joseph M. Vial Memorial Scholarship Program in Agriculture and the Nicholas Brice Worthington Scholarship Fund.

Student Organizations. Students find opportunity for varied expression and growth in the several voluntary organizations sponsored by the College of Agriculture. These organizations are: Agricultural Economics Club,

Block and Bridle, Dairy Science Club, Collegiate 4-H Club, Future Farmers of America, Agronomy Club, Horticultural Club, and the Veterinary Science Club.

Alpha Zeta is a national agricultural honor fraternity. Members are chosen from students in the College of Agriculture who have attained the scholastic requirements and displayed leadership in agriculture.

The Agricultural Student Council is made up of representatives from the various student organizations in the College of Agriculture. Its purpose is to coordinate activities of these organizations and to promote work which is beneficial to the college.

Required Courses. Courses required for students in the College of Agriculture are listed in each curriculum. The program of the freshman year is similar for all curriculums. Variations in programs will be suggested based on students' interests and test scores.

Typical Freshmen Program — College of Agriculture

		I	II
ENGL	101	3	
BOTN	101	4	
MATH		3	3
ANSC	101	3	
ZOOL	101		4
AGRO	100	2	
AGRO	102		2
AGRI	101	1	
SPCH	107		3
General University Requirement			3
Total Credits		16	15

The Agricultural Experiment Station. The Maryland Agricultural Experiment Station is currently conducting more than 200 research projects. These are conducted by faculty who supervise and direct research assistants, graduate and undergraduate students and technicians. The research may be conducted in laboratories or at one of the nine field locations throughout Maryland operated by the Experiment Station or even in fields, herds or flocks of cooperating farmers.

The overall objective of the Experiment Station is to enhance all aspects of Maryland agriculture for the benefit of farmers, agribusiness and consumers through optimal utilization, conservation and protection of soil and water resources. Genetic principles are studied and applied in the improvement of turf and ornamentals, vegetable crops, field crops, poultry, dairy and other animals. Similarly, pathological principles are of concern in improvement of methods of identification, prevention and/or control of plant and animal diseases. Biochemistry plays an important role in evaluating the nutritional quality of crops produced, the efficiency of feed conversion by poultry and animals or the quality of plant and animal products for human consumption. Research in progress is concerned with improvement of processing systems to enhance food quality on one hand and the impact of nutritional deficiencies and means of remedying these on the other. Also directly in the consumer area is the study of clothing quality.

Improved production techniques including waste utilization or disposal require studies involving soil-moisture-plant relationships and plant, bird, or animal-environment relationships and also studies of the applications of engineering for producing or maintaining the optimal environment for biological systems.

Studies of biological and mechanical methods as well as improved chemical control of insects in the field, forests, food processing chain and the home are continuous.

The socio-economics of changing agricultural systems are a major research area and increasing attention is being oriented towards rural development, including resource utilization for non-farm residents and recreation.

The Maryland Agricultural Experiment Station was established in 1888 to comply with the Hatch Act of 1887 authorizing the establishment of an agricultural experiment station at the Land Grant Colleges. Actually, the charter of the Maryland Agricultural College in 1856 specifically authorized establishment of a demonstration farm. The Station is supported by federal funds under the Hatch Act as amended, State appropriations, grants and contracts with State and federal agencies and by gifts or other support from individuals and agribusinesses.

Cooperative Extension Service. Cooperative Extension work, established by State and federal laws in 1914, extends practical information beyond the classrooms of the University of Maryland to young people and adults — both rural and urban — throughout the State of Maryland. Major program areas include agriculture and environment, family living, youth development, and community development.

The educational endeavors of the Cooperative Extension Service are financed jointly by federal, State and county governments. In each county and in Baltimore City competent extension agents conduct educational work in program areas consistent with the needs of the citizenry and as funds permit. The county staff is supported by a faculty of specialists in the Division of Agricultural and Life Sciences. Through their mutual efforts, local people are assisted in finding solutions to their problems.

The Cooperative Extension Service works in close harmony and association with many groups and organizations. In addition to work on farms and with agri-businesses, extension programs are aimed at many rural non-farm and urban family consumers. Thousands of boys and girls gain leadership knowledge and experience and are provided practical educational instruction in 4-H clubs and other youth groups.

To accomplish its mission, the Cooperative Extension Service works closely with teaching and research faculty of the University and with units of the University outside of agriculture, as well as State and federal agencies and private groups. Thousands of short courses, workshops and conferences in various fields of interest are conducted on the College Park Campus and at other locations throughout the State. A wide variety of publications and radio and television are used extensively to reach the people of Maryland.

Agriculture — General Curriculum

The General Agriculture curriculum provides for the development of a broad understanding in agriculture.

The flexibility of this curriculum permits selection of electives that will meet individual vocational plans in agriculture and agriculturally related business and industry.

General Agriculture Requirements

	Semester Credit Hours
General University Requirements	30
BOTN 101—General Botany*	4
ZOOL 101—General Zoology	4
CHEM 103—College Chemistry I*	4
CHEM 104—College Chemistry II	4
MATH —*	3
AGEN 100—Basic Ag. Engr. Technology	3
AGEN 200—Intro to Farm Mech	2
AGRO 100—Crop Prod. Lab	2
AGRO 202—General Soils	4
ANSC 101—Princ. of Animal Sci	3
ANSC 203—Feeds and Feeding	3
ANSC —**	3
AREC 250—Elements of Ag. & Res. Econ	3
AREC —**	3
BOTN 221—Diseases of Plants	4
ENTM 252—Ag. Insect Pests	3

HORT	—**	3
RLED	464—Rural Life in Mod. Soc	3
Community Development related, Life Science related, or Accounting		6
Electives (15 credit hours 300 or above)		26

*Satisfy Divisional Requirements
**Student may select any course(s) having required hours in the department indicated

Students will be encouraged to obtain summer positions which will give them technical laboratory or field experience in their chosen interest area.

Basic Curriculum Requirements

		Semester Credit Hours	
General University Requirements			30
BOTN	101—General Botany*	4	
CHEM	103—College Chemistry I*	4	
CHEM	104—College Chemistry II	4	
ZOOL	101—General Zoology	4	
AGRI	301—Introduction to Agricultural Biometrics	3	
AGRO	202—General Soils	4	
GEOL	100—Introductory Physical Geology	3	
ENTM	—	3	
ECON	—	3	
MATH	—*	9	41
Option Requirements**			
Fish and Wildlife Management			
Zoology		9	
Related Field		9	
Electives		3	
		28	49
Plant Resource Management			
Plant Management		9	
Botany		9	
Related Field		3	
Electives		28	49
Pest Management			
Pest Management		9	
Entomology		9	
Related Field		3	
Electives		28	49
Water Resource Management			
Water Resource Management		9	
Agronomy and Agricultural Engineering		6	
Related Field		6	
Electives		28	49
Resource Management			
Resource Management		9	
Economics or Agricultural and Resource Economics		9	
Related Field		3	
Electives		28	49

*Satisfies Divisional Requirements
**9 hours of the 21 hours of option requirements must be in upper level courses.

Agricultural and Extension Education

Professor and Acting Chairman: Poffenberger.
Professors: Nelson, Longest, Ryden (p.t.)
Assistant Professors: Seibel, Sorter, Wheatley, Wright.
Instructors: Glee (p.t.), Klavon.

Programs are offered in education and other applied behavioral sciences needed by persons preparing to teach agriculture or to enter extension work, community development, and other continuing education careers.

Three undergraduate curriculum options are available. The agricultural education curriculum is designed primarily for persons who wish to prepare for teaching agriculture in the secondary schools. The extension education options are designed for those preparing to enter the Cooperative Extension Service or other agencies engaged in educational and developmental programs. Any option may lead to a variety of other career opportunities in public service, business and industry, communications, research, and college teaching

Students preparing to become teachers of agriculture — including horticulture, agribusiness or other agriculturally related subjects — should have had appropriate experience with the kind of agriculture they plan to teach or should arrange to secure that experience during summers while in college.

In order to be able to serve as advisors of high school chapters of the FFA upon graduation, students in the agricultural education curriculum are expected to participate in the Collegiate Chapter of the Future Farmers of America.

Departmental Requirements: All Options

BOTN	101—General Botany	4
CHEM	103, 104—College Chemistry I, II	4,4
MATH	105—Mathematical Ideas	3
ZOOL	101—General Zoology	4
EDHD	300—Human Development and Learning*	6
RLED	464—Rural Life in Modern Society	3
RLED	303—Teaching Materials and Demonstrations	2

*PSYC 100—Introduction to Psychology (3 credits) and EDHD 460—Educational Psychology (3 credits) may be substituted by Extension Education students.

Agricultural Education Option

EDSF	301—Foundations of Education	3
RLED	302—Introduction to Agricultural Education	2
RLED	305—Teaching Young and Adult Farmer Groups	1
RLED	311—Teaching Secondary Vocational Agriculture	3
RLED	313—Student Teaching	5
RLED	315—Student Teaching	3
RLED	398—Seminar in Agricultural Education	1
AGEN	100—Basic Agricultural Engineering Technology	3
AGEN	200—Introduction to Farm Mechanics	2
AGEN	305—Farm Mechanics	2
AGRO	100—Crops Laboratory	2
AGRO	102—Crop Production	
	or	
AGRO	406—Forage Crop Production	2
AGRO	202—General Soils	4
ANSC	101—Principles of Animal Science	3
ANSC	203—Feeds and Feeding	3
AREC	406—Farm Management	
	or	
AREC	407—Financial Analysis of Farm Business	3
BOTN	221—Diseases of Plants	4
ENTM	252—Agricultural Insect Pests	3
HORT	222—Vegetable Production	
	or	
HORT	231—Greenhouse Management	
	or	
HORT	271—Plant Propagation	3

Extension Education: Agricultural Science and Youth Development Options

PSYC	221—Social Psychology	3
RLED	323—Developing Youth Programs	3
RLED	325—Directed Experience in Extension Education	1-5
RLED	327—Program Planning in Extension Education	3
RLED	422—Extension Education	3
RLED	423—Extension Communications	3

Extension Education: Agricultural Science Option

AGEN	100—Basic Agricultural Engineering Technology	3
AGRO	100—Crops Laboratory	2
AGRO	102—Crop Production	2
AGRO	202—General Soils	4
ANSC	101—Principles of Animal Science	3
ANSC	203—Feeds and Feeding	3
AREC	406—Farm Management	
	or	
AREC	407—Financial Analysis of the Farm Business	3
AREC	452—Economics of Resource Development	3
BOTN	221—Diseases of Plants	4
ENTM	252—Agricultural Insect Pests	3
HORT	222—Vegetable Production	
	or	
HORT	231—Greenhouse Management	
	or	
HORT	271—Plant Propagation	3

Extension Education: Youth Development Option

RLED	426—Development and Management of Extension Youth Programs	3
EDHD	411—Child Growth and Development	3
EDHD	413—Adolescent Development	3
FMCD	105—Introduction to Family Living	3
HLTH	450—Health Problems of Children and Youth	3
PSYC	333—Child Psychology	3
CRIM	450—Juvenile Delinquency	3
RECR	460—Leadership Techniques and Practices	3
RECR	490—Organization and Administration of Recreation	3
RECR	420—Program Planning	3

Agricultural and Resource Economics

Professor and Chairman: Curtis.
Professors: Beal, Bender, Cain, Foster, Ishee, Lessley, Moore, Murray, Poffenberger, Smith, Stevens, Tuthill, and Wysong.
Associate Professors: Beiter, Crothers, Hamilton (Emeritus), Hardie, Hoecker, Lawrence, Marasco, Via.
Assistant Professor: Bellows.
Visiting Professor: Abrahamsen.
Lecturer: Matteucci.
Instructor: Lea.

This curriculum combines training in the business, economics and international aspects of agricultural production and marketing with the biological and physical sciences basic to agriculture. Programs are available for students in agricultural economics, agricultural business, international agriculture, and resource economics. Students desiring to enter agricultural marketing or business affiliated with agriculture may elect the agricultural business option; and those interested in foreign service may elect the international agriculture option. Students primarily interested in the broad aspects of production and management as it is related to the operation of a farm business may elect the agricultural economics option. Those interested in training in the broad area of resource management and evaluation may elect the resource economics option.

In these programs, students are trained for employment in agricultural business firms; for positions in sales or management; for local, state, or federal agencies; for extension work; for high school and college teaching; for research, and for farm operation or management.

Courses for the freshman and sophomore years are essentially the same for all students. In the junior year the student selects the option of his or her choice. Courses in this department are designed to provide training in the application of economic principles to the production, processing, distribution, and merchandising of agricultural products and the effective management of our natural and human resources, as well as the inter-relationship of business and industry associated with agricultural products. The curriculum includes courses in general agricultural economics, marketing, farm management, prices, resource economics, agricultural policy, and international agricultural economics.

Required of All Students*

		Credit Hours
	General University Requirements	30
	Biological Sciences**	3
	Chemistry**	3
AREC	404—Prices of Agricultural Products	3
BSAD	220—Principles of Accounting	3
BSAD	230—Business Statistics I	
	or	
AGRI	301—Introduction to Agricultural Biometrics	3
ECON	201—Principles of Economics I	3
ECON	203—Principles of Economics II	3
ECON	401—National Income Analysis	3
ECON	403—Intermediate Price Theory	3
MATH	110—Introduction to Mathematics I**	3
MATH	111—Introduction to Mathematics II	3
MATH	220—Elementary Calculus	3
	Technical Agriculture***	9

*The student's total program must contain a minimum of 15 credit hours of courses in Agricultural and Resource Economics
**Satisfies a Division requirement
***A minimum of nine hours of technical agriculture must be selected in consultation with the student's advisor

Agribusiness Option

Each student must take the following:

AREC	406—Farm Management	3
AREC	427—The Economics of Marketing Systems for Agricultural Commodities	3
AREC	432—Introduction to Natural Resources Policy	3
	Other courses in Agricultural and Resource Economics	3
	Electives	33

Agricultural Economics Option

Each student must take the following:

AREC	406—Farm Management	3
ECON	425—Mathematical Economics	
	or	
ENGL	291—Expository Writing	3
MATH	221—Elementary Calculus	3
	Statistics	3
	Other courses in Agricultural and Resource Economics	9
	Electives	24

International Agriculture Option

Each student must take the following:

AREC	445—World Agricultural Development and the Quality of Life	3
ECON	415—Introduction to Economic Development of Underdeveloped Areas	3
ECON	440—International Economics	3
	Other courses in Agricultural and Resource Economics	9
	Electives	27

Resource Economics Option

Each student must take the following:

AREC	240—Environment and Human Ecology	3
AREC	452—Economics of Resource Development	3
ECON	450—Introduction to Public Finance	3
	Other courses in Agricultural and Resource Economics	6
	Electives	30

Course Code Prefix—AREC

Agricultural Chemistry

This curriculum insures adequate instruction in the fundamentals of both the physical and biological sciences. It may be adjusted through the selection of electives to fit the student for work in agricultural experiment stations, soil bureaus, geological surveys, food laboratories, fertilizer industries, and those handling food products.

		Credit Hours
	General University Requirements	30

Required of All Students:

CHEM	103—College Chemistry I or CHEM 105*	4
CHEM	104—College Chemistry II or CHEM 106	4
CHEM	201—College Chemistry III or CHEM 211	3
CHEM	202—College Chemistry III Laboratory or CHEM 212	2
CHEM	203—College Chemistry IV or CHEM 213	3
CHEM	204—College Chemistry IV Laboratory or CHEM 214	2
CHEM	321—Quantitative Analysis	4
AGRO	202—General Soils	4
GEOL	100—Introductory Physical Geology	3
MATH	141—Analysis II*	4
PHYS	141—Principles of Physics	4
PHYS	142—Principles of Physics	4
	Electives in Biology*	6

Electives in Agricultural Chemistry	10
Electives	33

*Satisfies Divisional Requirements
Course Code Prefix—CHEM

Agricultural Engineering

Professor and Chairman: Harris.
Professors: Green, Krewatch (Emeritus), Winn, Jr. (p.t.)
Associate Professors: Felton, Hummel, Merkel, Merrick (Emeritus), Stewart, Wheaton.
Assistant Professors: Grant, Johnson, Ross.
Specialist: Brodie.
Lecturer: Holton (p.t.)
Instructor: Carr.
Visiting Professor: Cowan.
Visiting Assistant Professor: Rebuck.

Agricultural engineering utilizes both the physical and biological sciences to help meet the needs of our increasing world population for food, natural fiber and improvement or maintenance of the environment. Scientific and engineering principles are applied to the conservation and utilization of soil and water resources for food production and recreation; to the utilization of energy to improve labor efficiency and to reduce laborious and menial tasks; to the design of structures and equipment for housing or handling of plants and animals to optimize growth potential; to the design of residences to improve the standard of living for the rural population; to the development of methods and equipment to maintain or increase the quality of food and natural fiber; to the flow of supplies and equipment to the agricultural and aquacultural production units; and to the flow of products from the production units and the processing plants to the consumer. Agricultural engineers place emphasis on maintaining a high quality environment as they work toward developing efficient and economical engineering solutions.

The undergraduate curriculum provides opportunity to prepare for many interesting and challenging careers in design, management, research, education, sales, consulting, or international service. The program of study includes a broad base of mathematical, physical and engineering sciences combined with basic biological sciences. Twenty hours of electives give flexibility so that a student may plan a program according to his major interest.

Course Code Prefix—AGEN

Departmental Requirements

		Semester Credit Hours
AGEN	324—Engineering Dynamics of Biological Materials	3
AGEN	424—Functional and Environmental Design of Agricultural Structures	3
AGEN	343—Functional Design of Machinery and Equipment	3
AGEN	421—Power Systems	3
AGEN	422—Soil and Water Engineering	3
ENCE	350—Structural Analysis and Design I	3
ENES	101—Intro. Engineering Science	3
ENES	110—Statics	3
ENES	220—Mechanics of Materials	3
ENES	221—Dynamics	3
ENME	300—Materials Science and Engineering	
or		
ENCE	300—Fund. Of Engineering Materials	3
ENME	216—Thermodynamics I	3
ENME	342—Fluid Mechanics I	
or		
ENCE	330—Basic Fluid Mechanics	3
ENEE	300—Principles of Electrical Engineering	3
MATH	140, 141—Analysis I, II	4,4
MATH	241—Analysis III	4
MATH	246—Differential Equations for Scientists and Engineers	
or		
ENME	380—Applied Math in Engineering	3
ZOOL	101—General Zoology	
or		
BOTN	101—General Botany	4
CHEM	103, 104—College Chemistry I, II	4,4
PHYS	161, 262, 263—General Physics	3,4,4
Technical Electives*		14
General University Requirements**		30
Electives		6

*Technical electives, related to field of concentration, must be selected from a departmentally approved list. Eight credits must be 300 level and above.
**Students must consult with department advisors to ensure the selection of appropriate courses for their particular program of study

Agronomy

Chairman and Professor: J. Miller.
Professors: Axley, Clark, Decker, Foss, Hoyert, McKee, F. Miller, Rothgeb (Emeritus), Street (Emeritus), Strickling.
Associate Professors: Aycock, Bandel, Burt, Fanning, Mulchi, Newcomer, Parochetti.
Assistant Professors: Hall, Hawes, Johnson, Undersander, Wolf.
Instructor: Rivard.

Instruction is offered in crop science and soil science. A turf and urban agronomy option is offered under crop science and a conservation of soil, water and environment option is offered under soil science. These options appeal to students who are interested in urban problems or environmental science. The agronomy curricula are flexible and allow the student either to concentrate on basic science courses that are needed for graduate work or to select courses that prepare for employment at the bachelor's degree level as a specialist with park and planning commissions, road commissions, extension service, soil conservation service, and other governmental agencies. Many graduates with the bachelor's degree are also employed by private corporations such as golf courses and seed, fertilizer, chemical, and farm equipment companies.

Agronomy students who follow the Journalism-Science Communication option are prepared to enter the field of science communication. Opportunities in this area are challenging and diverse. Students who are interested in public relations may find employment with industry or governmental agencies. Others may become writers and, in some cases, science editors for newspapers, publishing houses, radio, and television. Technical and professional journals hire students trained in this field as editors and writers. Also, this training is valuable to students who find employment in university extension programs, as a large part of their work involves written communication with the public.

Students completing graduate programs are prepared for college teaching and research, or research and management positions with industry and governmental agencies.

Additional information on opportunities in agronomy may be obtained by writing to the Department of Agronomy.

Departmental Requirements. (22-23 semester hours)

		Semester Credit Hours
CHEM	103—College Chemistry I*	4
CHEM	104—College Chemistry II	4
MATH	—*	3-4
BOTN	101—General Botany*	4
AGRO	100—Crops Laboratory	2
AGRO	202—General Soils	4
AGRO	398—Senior Seminar	1

*Satisfies Division of Agriculture and Life Sciences requirements

Crop Science Curriculum (68 semester hours)

		Semester Credit Hours
AGRO	—Advanced Crops Courses	6
AGRO	—Advanced Soils Courses	6
BOTN	212—Plant Taxonomy	3
BOTN	221—Diseases of Plants	4

BOTN	441—Plant Physiology	4
Electives		45

Crop Science options are listed under Crop and Soil Science Options

Soil Science Curriculum (68 semester hours)

		Semester Credit Hours
AGRO	—Advanced Crops Courses	4
AGRO	414—Soil Classification and Geography	4
AGRO	417—Soil Physics	3
AGRO	421—Soil Chemistry	3
Electives		54

Soil Science options are listed under Crop and Soil Science Options

Crop and Soil Science Options
Turf and Urban Agronomy Option

Students following this option in the Crop Science curriculum must include the following courses among their electives:

		Semester Credit Hours
AGRO	405—Turf Management	3
AGRO	415—Soil Survey and Land Use	3
HORT	160—Introduction to the Art of Landscaping	3
HORT	453—Woody Plant Materials	3
RECR	495—Planning, Design, and Maintenance of Park and Recreational Areas and Facilities	3

Conservation of Soil, Water, and Environment Option

Students following this option in the Soil Science curriculum must include the following courses among their electives:

		Semester Credit Hours
AGRO	413—Soil and Water Conservation	3
AGRO	423—Soil-Water Pollution	3
AGRO	415—Soil Survey and Land Use	3
AGEN	432—General Hydrology	3
AGRI	489—Spec. Top. in Agri	3
BOTN	211—Principles of Conservation	3
GEOG	445—Climatology	3

Journalism-Science Communication Option

A student following this option in the Crop Science or Soil Science curriculum must elect journalism and basic science and math courses in addition to the required curriculum courses. Many combinations will be acceptable. The advisor can aid in helping the student plan an appropriate program.

Course Code Prefix—AGRO

Animal Sciences

Department of Animal Science

Professor and Chairman: Young.
Professors: Foster (Emeritus), Green, Leffel.
Associate Professors: Buric, DeBarthe, Goodwin (Extension).
Assistant Professors: Kunkle (Extension), McCall.
Instructor: Curry.

Department of Dairy Science

Professor and Chairman: Davis.
Professors: Cairns, Keeney, King, Mattick, Vandersall, Williams.
Associate Professors: Chance, Douglass, Morris, Westhoff.
Assistant Professors: Holdaway, Majeskie, Vijay.
Instructor: Seely.

Department of Poultry Science

Associate Professor and Chairman: Thomas.
Professors: Shaffner, Shorb (Emeritus).
Associate Professors: Bigbee, Heath, Quigley (Emeritus), Soares, Wabeck.
Assistant Professors: Carter, Kuenzel.
Extension Assistant Professor: Nicholson.

Department of Veterinary Science

Professor and Chairman. Hammond.
Professor: Mohanty.
Associate Professors. Albert, Dutta, Johnson, Marquardt
Assistant Professors: Campbell, Gorgacz, Ingling.

The curriculum in animal sciences offers a broad background in general education, basic sciences, and agricultural sciences, and the opportunity for students to emphasize that phase of animal agriculture in which they are specifically interested. Each student will be assigned to an advisor according to the program he or she plans to pursue.

Curriculum requirements in Animal Sciences can be completed through the Departments of Animal Science, Dairy Science or Poultry Science. Programs of elective courses can be developed which provide major emphasis on beef, cattle, sheep, swine or horses, dairy or poultry. Each student is expected to develop a program of electives in consultation with an advisor by the beginning of the junior year.

Objectives. The following specific objectives have been established for the program in animal sciences.

1. To acquaint students with the role of animal agriculture in our cultural heritage.
2. To prepare students for careers in the field of animal agriculture. These include positions of management and technology associated with animal, dairy, or poultry production enterprises; positions with marketing and processing organizations; and positions in other allied fields, such as feed, agricultural chemicals and equipment firms.
3. To prepare students for entrance to veterinary schools.
4. To prepare students for graduate study and subsequent careers in teaching, research and extension, both public and private.
5. To provide essential courses for the support of other academic programs of the University.

Required of All Students:

		Semester Credit Hours
General University Requirements		30
Required of All Students:		
ANSC	101—Principles of Animal Science	3
FDSC	111—Contemporary Food Industry and Consumerism	3
ANSC	201—Basic Principles of Animal Genetics	3
ANSC	211—Anatomy of Domestic Animals	4
ANSC	212—Applied Animal Psychology	4
ANSC	401—Fundamentals of Nutrition	3
ANSC	412—Introduction to Diseases of Animals	3
CHEM	103—College Chemistry I*	4
CHEM	104—College Chemistry II	4
MICB	200—General Microbiology	4
ZOOL	101—General Zoology*	4
SPCH	107—Public Speaking	3
MATH	—*	3
		45
Electives		45**

*Satisfies Divisional Requirements
**Nine credits of these electives must be from offerings in the major option selected by the student

Course Code Prefix—ANSC

Conservation and Resource Development Programs

The development and use of natural resources (including water, soil, minerals, fresh water and marine organisms, wildlife, air and human resources) are essential to the full growth of an economy.

The curriculum in Conservation and Resource

Development is designed to instill concepts of the efficient development and judicious management of natural resources. The study of the problems associated with use of natural resources will acquaint students with their role in economic development while maintaining concern for the quality of the environment.

Students will prepare for professional and administrative positions in land and water conservation projects, for careers in operational, administrative, educational, and research work in land use, fish and wildlife management, natural resource management, recreational area development, and management, or for graduate study in any of the several areas within the biological sciences.

Students will pursue a broad education program and then elect subjects concentrated in a specific area of interest. Students will be assigned an advisor according to their area of interest.

Food Science Program

Professor and Coordinator: King (Dairy Science).
Professors: Bender (Agricultural and Resource Economics); Young (Animal Science); Davis, Keeney and Mattick (Dairy Science); Kramer, Twigg and Wiley (Horticulture).
Associate Professors: Wheaton (Agricultural Engineering); Buric (Animal Science); Westhoff (Dairy Science); Bigbee, Heath and Thomas (Poultry Science).
Assistant Professors: Vijay (Dairy Science); Solomos (Horticulture).
Instructor: Seeley (Dairy Science).

Food Science is concerned with all aspects of presenting food to the consumer in a manner that would satisfy man's needs both nutritionally and aesthetically. The Food Science Curriculum is based on the application of the fundamentals of the physical and biological sciences to the production, procurement, preservation, processing, packaging and marketing of foods. Specialization is offered in the areas of meats, milk and dairy products, fruits and vegetables, poultry and poultry products and seafood products.

Opportunities for careers in food science are available in industry, universities and government. Specific positions for food scientists include product development, production management, engineering, research, quality control, technical sales and service, teaching, and environmental health.

		Semester Credit Hours
General University Requirements		30
Division Requirements:		
CHEM	103—College Chemistry I	4
MICB	200—General Microbiology	4
MATH	—	3
Curriculum Requirements:		
AGEN	313—Mechanics of Food Processing	4
CHEM	104—College Chemistry II	4
CHEM	203, 204—College Chemistry IV and College Chemistry Laboratory IV	3,2
FDSC	111—Contemporary Food Industry and Consumerism	3
FDSC	398—Seminar	1
FDSC	412, 413—Principles of Food Processing I, II	3,3
FDSC	421—Food Chemistry	3
FDSC	422—Food Product Research and Development	3
FDSC	423—Food Chemistry Laboratory	2
FDSC	430—Food Microbiology	2
FDSC	431—Food Quality Control	4
FDSC	434—Food Microbiology Laboratory	2
FDSC	442, 451, 461, 471, 482—Horticultural, Dairy, Poultry, Meat end Seafood Products Processing (2 required)	3,3
NUSC	402—Fundamentals of Nutrition	3
PHYS	121—Fundamentals of Physics	4
Electives		27

Course Code Prefix—FDSC

Horticulture

Professor and Chairman: Twigg.
Professors: Kramer, Link, Reynolds, Rogers, Scott (Emeritus), Shanks, Stark, Thompson, Wiley.
Associate Professors: Baker, Bouwkamp, Gouin, Schales, Soergel.
Assistant Professors: Beste, Funt, Kundt, McClurg, Pitt, Sedovic, Stiles, Solomos.
Instructors: Todd, Wootton.

The horticulturist combines a knowledge of the basic sciences with an intimate knowledge of plants and their requirements in an effort to help meet the food needs of the world population and to help beautify man's surroundings. The horticulturist, specifically, is involved with fruit production (pomology), vegetable production (olericulture), greenhouse plant production (floriculture), production of ornamental trees and shrubs, post-harvest horticulture, and the tasteful planning of gardens and ornamental plantings (landscape design). Horicultural principles are essential to designing the landscape for improvement of the human environment. Post-harvest horticulture is involved with the storage and transportation of horticultural products until they reach the consumer.

The curriculum in Horticulture prepares students for a future in commercial production of the horticultural crops, and for employment in the horticultural industries such as fruit and vegetable processing, seed production and sales, agricultural chemical sales and service, florist shops and garden centers, and as horticulturists for parks, highway systems, botanic gardens and arboretums.

Majors may prepare for work with handicapped persons as horticultural therapists by electing appropriate courses in the social sciences and in recreation. The Horticultural Education option is designed for those who wish to teach horticulture in the secondary schools. It prepares the graduate with a basic knowledge of horticulture and includes the courses required for certification to teach in Maryland.

Advanced studies in the Department, leading to the M.S. and Ph.D. degrees, are available to outstanding students having a strong horticultural motivation for research, university teaching and/or extension education.

Curriculum in Horticulture

		Credit Hours
General University Requirements		30
Departmental Requirements — All Options:		
AGRO	202—General Soils	4
BOTN	101—General Botany*	4
BOTN	221—Diseases of Plants	4
BOTN	441—Plant Physiology	4
CHEM	103—College Chemistry I*	4
CHEM	104—College Chemistry II	4
HORT	271—Plant Propagation	3
HORT	398—Seminar	1
MATH*		3
		31

*Satisfies Divisional Requirements.

Complete the requirements in one of the following options:

Floriculture and Ornamental Horticulture Option:

BOTN	212—Plant Taxonomy	3
HORT	132—Garden Management	2
HORT	160—Introduction to the Art of Landscaping	3
HORT	231—Greenhouse Management	3
HORT	260—Basic Landscape Composition	2
HORT	274—Genetics of Cultivated Plants	3
HORT	451—Technology of Ornementals	3
HORT	453, 454—Woody Plant Materials	3,3
HORT	432—Fundamentals of Greenhouse Crop Production	
	or	
HORT	456—Production and Maintenance of Woody Plants	3
Electives		31
		59

Horticultural Education Option:

AGRO	405—Turf Management	3
BOTN	212—Plant Taxonomy	3
HORT	111—Tree Fruit Production	3
HORT	132—Garden Management	2
HORT	160—Introduction to the Art of Landscaping	3
HORT	222—Vegetable Production	3
HORT	231—Greenhouse Management	3
HORT	260—Basic Landscape Composition	2
HORT	453—Woody Plant Materials	3
EDHD	300—Human Development and Learning	6
EDSF	301—Foundations of Education	3
RLED	302—Introduction to Agricultural Education	2
RLED	303—Teaching Materials and Demonstrations	2
RLED	305—Teaching Young and Adult Farmer Groups	1
RLED	311—Teaching Secondary Vocational Agriculture	3
RLED	313—Student Teaching	5
RLED	315—Student Teaching	1-4
Electives		8-11
		59

Pomology and Olericulture Option:

ENTM	252—Agricultural Insect Pests	4
HORT	111, 112—Tree Fruit Production	3,2
HORT	212—Berry Production	3
HORT	222—Vegetable Production	3
HORT	274—Genetics of Cultiveted Plants	3
HORT	411—Technology of Fruits	3
HORT	422—Technology of Vegetables	3
HORT	474—Physiology of Maturation and Storage of Horticultural Crops	2
Electives		33
		59

Course Code Prefix—HORT

Pre-Forestry

Pre-forestry students are advised in the Department of Horticulture. The State of Maryland has an agreement with the Southern Regional Education Board and North Carolina State University providing for six Maryland residents who have completed two years' study in pre-forestry and have been accepted by the School of Forest Resources at North Carolina State University. The State of Maryland will make payment toward the non-resident tuition for a period not to exceed two years (four semesters) in accordance with the funds appropriated in the State budget for this purpose.

The Pre-Forestry Curriculum includes:

	Semester Credit Hours
ENGL 101, 291, or 292 or 293	6
English or Speech Elective	3
BOTN 101, 212	7
CHEM 103, 104	8
Economics	3
HORT 171	3
MATH 220, 221	6
PHYS 121, 122	8
Social Sciences & Humanities	12
ZOOL 101	4

Other suggested courses include:
AGRO 202, BOTN 211, ENTM 200.

Pre-Theology

The College of Agriculture cooperates with the officers of any theological seminary who desire to urge prospective students to pursue courses in agriculture as a preparation for the rural ministry. Such pre-theological students may enroll for a semester or more or for the usual four-year program of the College. In either case they should enroll as members of the general curriculum in the College of Agriculture. Students desiring to pursue a pre-theological program in the College of Agriculture of the University of Maryland should consult with the president or admissions officer of the theological seminary which they expect to attend.

Pre-Veterinary Medicine

The pre-veterinary medicine program is based upon the requirements established by the Colleges of Veterinary Medicine where students who are residents of Maryland may be offered admission.

There is no College of Veterinary Medicine in Maryland. However, the State of Maryland participates under an agreement with the Southern Regional Education Board for the education of Maryland residents in veterinary medicine. Up to twelve spaces a year in the College of Veterinary Medicine at the University of Georgia, and up to six places in the four years at Tuskegee Institute are reserved for qualified Maryland residents who may be offered admission by the respective institutions.

The University of Maryland also has an agreement with The Ohio State University under which a maximum of six Maryland residents may be offered admission each year by the College of Veterinary Medicine at Ohio State University.

The Colleges of Veterinary Medicine at the University of Georgia, The Ohio State University and Tuskegee Institute have the final and exclusive authority on all matters related to admission.

It is not possible for Colleges of Veterinary Medicine to admit all eligible applicants. Therefore, pre-professional students are urged to consider alternate objectives in a program leading to the B.S. degree.

Undergraduate students who have completed three years in the pre-veterinary program in the University of Maryland College of Agriculture and have not been admitted to a college of veterinary medicine may transfer to one of the curriculums at the University of Maryland in order to complete the B.S. degree.

No specific major is required for favorable consideration by a veterinary school admissions committee.

The course requirements listed represent the minimum requirements for admission to the Colleges of Veterinary Medicine, University of Georgia, Tuskegee Institute and Ohio State.

Chemistry	16
Physics	8
Mathematics	3
Biology (including genetics)	12
English	6-8
Humanities and Social Studies	14
Electives*	10

*Students are encouraged to elect courses in Animal Science, Biochemistry, Comparative Anatomy, Microbiology and Physiology

Combined Degree Curriculum — College of Agriculture and Veterinary Medicine.

Students enrolled in the College of Agriculture who have completed at least 90 hours, including all University, Division and College requirements, plus additional credits in Animal Science, may qualify for the B.S. degree from the University of Maryland, College of Agriculture, upon successful completion in a College of Veterinary Medicine of at least 30 semester hours.

Combined Degree Requirements

General University Requirements		30
ANSC	221—Fundamentals of Animal Reproduction	3
ANSC	211—Anatomy of Domestic Animals	4
ANSC	212—Applied Animal Physiology	4
BOTN	101—General Botany*	4
ZOOL	101—General Zoology	4
Mathematics (must include at least 3 credits of Calculus)*		6
CHEM	103—College Chemistry I	4
CHEM	104—College Chemistry II	4
CHEM	201—College Chemistry III	3
CHEM	202—College Chemistry Laboratory III	2
CHEM	203—College Chemistry IV	3
CHEM	204—College Chemistry Laboratory IV	2
PHYS	121—Fundamentals of Physics I	4

Pre-professional Programs within the College of Agriculture

PHYS 122—Fundamentals of Physics II	4
Electives	9

*Satisfies Divisional Requirements

Additional information about this program may be obtained from the Department of Veterinary Science.

Institute of Applied Agriculture Two-Year Program.

The programs of study offered by the Institute of Applied Agriculture will assist men and women interested in preparing for specific jobs in the broad fields of applied science and business in agriculture.

Three major programs are currently offered:

1. *Business Farming* — technical training for farm operation, or a career in business providing supplies and services to those in production agriculture.
2. *Turfgrass and Golf Course Management* — concentrates on the technical and management skills required for professional turf management and for occupations in the rapidly expanding field of turf maintenance.
3. *Ornamental Horticulture and Nursery Management* — a program leading toward several occupational choices including greenhouse management, nursery management, landscape management, and floral shop management.

Courses taken in these programs are not transferable for degree credits at the University of Maryland. Students satisfactorily completing two years of study are awarded an appropriate certificate. For additional information write: Director, Institute of Applied Agriculture, University of Maryland, College Park, Maryland 20742.

Biological Sciences Program

This program is designed for the student who is interested in a broader education in the biological sciences than is available in the programs for majors in the various departments of the Division of Agricultural and Life Sciences. The program is appropriate for the entering student who wishes to explore the various areas of biology before specializing in the program offered by a single department, or for the student desiring to specialize in a discipline which can best be constituted by the selection of courses from the various departments in the biological sciences.

Preparation for graduate study in a specialized area of biology is readily accomplished under this program by the judicious selection of junior-senior level courses in the proposed area of graduate concentration. Where the proposed area of graduate specialization lies within a single departmental discipline, it may be desirable for the student to transfer to the program for majors in that department.

Advising of students in this curriculum will be coordinated in a central advising office to be established by the Division of Agricultural and Life Sciences. The student in this program may emphasize work in animal science, botany, entomology, microbiology, or zoology and will be advised by the department or curriculum in which most of the work is taken. Alternatively, the student may concentrate in a specialized area of biology (e.g. ecology, genetics or physiology) which cuts across departmental boundaries. In this case an advisor competent in the area of emphasis will be selected. For careful planning and advising, the area of emphasis should be chosen as soon as possible, and must be declared before registration for the junior year. Changes in emphasis normally cannot be made during the senior year without delaying graduation. Students in this program who are also attempting to meet the requirements of a pre-professional program should also seek advice from advisers for the respective programs. Students in the program who wish to prepare for secondary school science teaching should contact the staff of the Science Teaching Center of the College of Education for information concerning requirements for certification.

Curriculum. All students in the Biological Sciences Program must satisfy the requirements of the University of Maryland at College Park and the requirements of the Division of Agricultural and Life Sciences.

Basic Course Requirements.

1. A course in general biological principles, including laboratory, which may be satisifed by any one of the following courses:
   a. BOTN 101, General Botany for Agricultural and Science Students (4).
   b. ZOOL 101, General Zoology (4).
2. Two courses in diversity of living organisms including BOTN 202, the Plant Kingdom (4), and either ENTM 200, Introduction to Entomology (3), or ZOOL 293, Animal Diversity (4).
3. MICB 200, General Microbiology (4).
4. A basic course in genetics which may be satisfied by one of the following courses:
   a. ANSC 201, Basic Principles of Animal Genetics (3).
   b. BOTN 414, Plant Genetics (3).
   c. ZOOL 246, Genetics (4).
   d. HORT 274, Genetics of Cultured Plants (3).
5. Required supporting courses in mathematics and physical sciences:
   a. MATH 110, 111, Introduction to Mathematics I, II (3,3) or MATH 115, 140, Introduction to Analysis and Analysis I (3,4) or any higher mathematics sequence for which these courses are prerequisite. (For many areas of biology, completion of a year of calculus, MATH 220, 221 or MATH 140, 141 is recommended.)
   b. CHEM 103, 104 or CHEM 105, 106, College Chemistry I, II (4,4). CHEM 203, 204 or CHEM 213, 214, College Chemistry IV (3,2). Students in certain programs will also need CHEM 201, 202, College Chemistry III (3,2).
   c. PHYS 121, 122 or 141, 142, Fundamentals of Physics (4,4).

It is not necessary that all the required courses listed above be completed before registering for advanced courses; however, these courses are prerequisite to many of the advanced courses and should be completed early in the program.

Advanced Program. In addition to the required courses listed above, the student must complete 22 hours of biological sciences selected from approved courses in animal science, botany, entomology, microbiology or zoology, or in other courses which have been specifically approved by the Biological Sciences Committee. Of these credits, at least two courses must involve laboratory or field work and at least 18 hours must be in courses numbered 300 or above. Two of the five departments listed above must be represented by at least one course in the 18 hours of 300-400 level work. Courses currently approved for the advanced program include:

AGRO 105, 403, 422 and 423.
AGRI 301 or 401 or an equivalent.
ANSC 211, 212, 252, 401, 406, 411, 412, 413, 414, 416, 446, 452 and 466.
BOTN All courses except BOTN 100, 101, 202 and 414.
CHEM 201, 202, 261, 461, 462, 463, and 464.
ENTM All courses except ENTM 100 and 111.
HORT 171 and 271.
MICB All courses except MICB 200 and 322.
PSYC 400, 402, 403, 410, 412 and 479.
ZOOL all courses except ZOOL 101, 146, 207 and 246.

Research experience in various fields of biology, biochemistry and psychology are possible under this plan by special arrangement with faculty research advisers. Not more than 3 hours of special problems or research can be taken as part of the advanced program requirement of 22 hours.

A Biological Sciences Honors Program is under consideration. Inquiries about such a program should be directed to the Chairman of the Biological Sciences Committee.

Botany

Professor and Chairman: Sisler.
Professors: Brown (Emeritus), Corbett, Galloway, Gauch (Emeritus), Kantzes, Klarman, Krusberg, D. T. Morgan, O. D. Morgan, Patterson, Sorokin (Emerita), Stern, Weaver.
Associate Professors: Barnett, Bean, Curtis, Karlander, Lockard, Motta, Rappleye, Reveal.
Assistant Professors: Blevins, Bottino, Broome, Harrison, Stevenson, Van Valkenburg.
Instructors: Grigg, Higgins.

The Department offers work in the major fields of physiology, pathology, ecology, taxonomy, anatomy-morphology, and genetics.

The required courses for the freshman and sophomore years are the same for all students. In the junior and senior years, the student elects botany courses to suit his/her particular interest. Courses are required in other subjects to satisfy General University Requirements which contribute toward a broad cultural education, and to support the courses selected in the chosen field of botany.

The curriculum provides a complete survey of the field of botany, and lays a good foundation for graduate work in botany in preparation for teaching and for research in experiment stations or private research laboratories.

Students who wish to meet the requirements for certificates in secondary education are required to meet the specific science and mathematics requirements for a biology science education major, in addition to the regular education block and student teaching. Student teaching is a full-time semester commitment. As long as the demand continues, a series of advanced courses will be offered in rotation in the summer session, especially for teachers working toward the degree of Master of Education in science teaching.

The Department of Botany has instituted an Honors Program which a student may enter if he/she desires and if he/she meets the requirements of the program.

Department of Botany Requirements

		Semester Credit Hours
BOTN	101—General Botany	4
BOTN	202—Plant Kingdom	4
BOTN	212—Plant Taxonomy	3
BOTN	221—Diseases of Plants	4
BOTN	414—Plant Genetics	3
BOTN	416—Principles of Plant Anatomy	4
BOTN	441—Plant Physiology	4
BOTN	462—Plant Ecology	2
CHEM	103—College Chemistry I*	4
CHEM	104—College Chemistry II	4
MATH	110, 111—Introduction to Mathematics or MATH 140, 141*	6
MICB	200—General Microbiology	4
PHYS	121—Fundamentals of Physics I	4
PHYS	122—Fundamentals of Physics II	4
ZOOL	101—General Zoology*	4
Botany electives or related courses		10
Electives		22
General University Requirements		30

*Satisfy Division requirements.

Course Code Prefix—BOTN

	Credit Hours
General University Requirements	30
Divisional Requirements	
Biological Science 3 or 4	
MATH, CHEM (See Below)	
Departmental Requirements	27
GEOL 100 (3)	
GEOL 102 (3)	
GEOL 110 (1)	
GEOL 112 (1)	
GEOL 399 (2)	
GEOL 422 (4)	
GEOL 431 (4)	
GEOL 441 (4)	
Geology Summer Camp (5)	
Supporting Requirements	24
CHEM 103, 104 (4, 4)	
MATH 140, 141 (4, 4)	
PHYS 121, 122 (4, 4)	
Electives	35 or 36

Chemistry

Chairman: Vanderslice.
Associate Chairman: Castellan.
Professors: Adler, Castellan, Freeman, Gardner, Goldsby, Gordon, Grim, Henery-Logan, Holmlund, Huheey, Jaquith, Keeney, Munn, Pickard, Ponnamperuma, Purdy, Reeve, Rollinson, Staley, Stewart, C. Stuntz, Svirbely (Emeritus), Vanderslice, Veitch (Emeritus), Viola.
Associate Professors: Alexander, Ammon, Bellama, Boyd, Campagnoni, Davis, DeVoe, Hansen, Jarvis, Kasler, Khanna, Lakshmanan, Martin, Mazzocchi, Miller, Moore, Murphy, O'Haver, Sampugna, Walters Zoller.
Assistant Professors: Bergeron, Heikkinen, Helz, Rowalz, Tossell.
Research Professor: Bailey.
Visiting Professors: Breger (p.t.), Rose (p.t.).
Lecturers: Beale, Butler (p.t.), Charken (p.t.), Fisher, Kilbourne, Shaw (p.t.), Tesi (p.t.).
Instructors: Doherty, Gamble, Ingangi, Schiesler, S. Stuntz.
Visiting Associate Professor: Schoffstall (p.t.).

The curriculum in chemistry is centered around a basic core of 30 credits (18 lower-division and 12 upper-division) in chemistry. An additional two credits must be chosen from among other upper-division courses in chemistry. The program is designed to provide the maximum amount of flexibility to students seeking preparation for either the traditional branches of chemistry or the interdisciplinary fields. Students wishing a degree program specifically certified by the American Chemical Society must elect more than the minimum number of elective credits in chemistry and must choose judiciously among the upper-division courses offered. In addition, the ACS-certified degree program presently recommends German or Russian.

A sample program, listing only the required or recommended courses, is given below. It is expected that each semester's electives will include courses intended to satisfy the general requirements of the University or of the Division of Agricultural and Life Sciences, plus others of the student's choice.

FIRST YEAR

Chem 103 or 105	4	Chem 104 or 106	4
Math 140*	4	Math 141*	4
Electives	7	Electives	7
	15		15

*Students initially placed in MATH 115 will delay MATH 140 and 141 one semester

SECOND YEAR

Chem 201 or 211	3	Chem 203 or 213	3
Chem 202 or 212	2	Chem 204 or 214	2
Physics 141	4	Physics 142	4
Electives	6	Electives	6
	15		15

THIRD YEAR

Chem 430	3	Chem 431	3
Chem 481	3	Chem 482	3
Electives	9	Electives	9
	15		15

FOURTH YEAR

Electives	15	Electives	15

For American Chemical Society certification the student should consult his or her advisor for course recommendations that will meet certification requirements.

Agricultural Chemistry. A program in Agricultural Chemistry is offered within the College of Agriculture. See page for details.

Biochemistry. The Chemistry Department also offers a major in biochemistry. In addition to the lower-division chemistry sequence, the program requires: Chemistry 461 and 462; Chemistry 481 and 482; Chemistry 430 and 464, MATH 140 and 141; PHYS 141 and 142; and nine credits of approved biological science that must include at least one upper-division course. A sample program, listing only the required courses, is given below. It is expected that each semester's electives will include courses intended to satisfy the general requirements of the University or of the Division of Agricultural and Life Sciences, plus others of the student's choice.

FIRST YEAR

Chem 103 or 105	4	Chem 104 or 106	4
Math 140*	4	Math 141	4
Electives**	7	Electives	7
	15		15

*Students initially placed in MATH 115 will delay MATH 140 and 141 one semester.
**It is suggested that the first year electives include at least one course in biological science.

SECOND YEAR

Chem 201 or 211	3	Chem 203 or 213	3
Chem 202 or 212	2	Chem 204 or 214	2
Physics 141	4	Physics 142	4
Electives	6	Electives	6
	15		15

THIRD YEAR

Chem 481	3	Chem 482	3
Chem 430	3	Chem 464	2
Chem 461	3	Chem 462	3
Electives	6	Electives	7
	15		15

FOURTH YEAR

Electives	15	Electives	15

The Chemistry Department's Honors Program begins in the junior year. Interested students should see the Departmental Honors Committee for further information.

Entomology

Professor and Acting Chairman: Steinhauer.
Professors: Bickley, Corey (Emeritus), Harding, Harrison, Jones, Menzer, Messersmith.
Associate Professors: Bessell (Emeritus), Caron, Davidson, Haviland (Emerita), Krestensen, Reichelderfer, Wood.
Assistant Professor: Linduska.
Lecturers: Heimpel, Spangler.
Visiting Professor: Wirth.
Visiting Assistant Professor: Miller.
Instructor: Hellman.

This curriculum prepares students for various types of entomological positions or for graduate work in any of the specialized areas of entomology. Professional entomologists are engaged in fundamental and applied research in university, government, and private laboratories; regulatory and control activities with federal and state agencies; commercial pest control and pest management services; sales and development programs with chemical companies and other commercial organizations; consulting, extension work; and teaching.

Most of the first two years of the curriculum is devoted to obtaining the essential background. In the junior and senior years there is an opportunity for some specialization or for electing courses in preparation for graduate work. Students contemplating graduate work are strongly advised to elect courses in physics, modern foreign languages, mathematics, and biometrics.

Department of Entomology Requirements

	Semester Credit Hours
General University Requirements	30
ZOOL 293—Animal Diversity	4
BOTN 101—General Botany*	4
CHEM 103, 104—College Chemistry I, II*	4,4
CHEM 201, 202—College Chemistry III and College Chemistry Laboratory III	3,2
MATH*	6
GENETICS	3
2 of the following 3 courses	
BOTN 212—Plant Taxonomy	3
BOTN 221—Diseases of Plants	4
CHEM 461—Biochemistry I	3
MICB 200—General Microbiology	4
ENTM 204—General Entomology	4
ENTM 421—Insect Taxonomy and Biology	4
ENTM 432—Insect Morphology	4
ENTM 442—Insect Physiology	4
2 of the following 3 courses	
ENTM 451—Economic Entomology	4
ENTM 462—Insect Pathology	3
ENTM 472—Medical and Veterinary Entomology	4
ENTM 498—Seminar	1
ENTM 399—Special Problems	2
Electives	22-24

*Satisfies Divisional requirements
Course Code Prefix—ENTM

Geology

Associate Professor and Acting Chairman: Siegrist.
Associate Professors: Segovia, Sommer, Stifel, Weidner.
Assistant Professors: Ridky, Wylie.

Geology is the basic science of the earth. In its broadest sense, geology concerns itself with planetary formation and modification with emphasis on the study of the planet Earth. This study directs its attention at the earth's internal structure, materials, chemical and physical processes and its physical and biological history. Geology concerns itself with the application of geological principles and with application of physics, chemistry, biology and mathematics to the understanding of our planet.

Geological studies thus encompass understanding the development of life from the fossil record, the mechanics of crustal movement and earthquake production, the evolution of the oceans and their interaction with land, the origin and emplacement of mineral and fuel resources and the determination of man's impact on the geological base level.

Geological scientists find employment in government, industrial and academic establishments. In general, graduate training is expected for advancement to the most rewarding positions. Most industrial positions require a M.S. degree. Geology is enjoying a strong employment outlook at the present because of our mineral, fuel and environmental concerns. At this time, students with the B.S., particularly those with training in geophysics, can find satisfactory employment. However, graduate school is strongly recommended for those students desiring a professional career in the geosciences.

The Geology Program includes a broad range of undergraduate courses to accommodate both geology majors and students interested in selected aspects of the science of the Earth. Opportunities exist for undergraduate research projects, on a personal level, between students and faculty members.

The Geology curricula is designed to meet the requirements of industry, graduate school and government. However, students may select, at their option, geology electives that are designed for a particular interest, rather than for the broad needs of a professional career. Courses required for the B.S. in Geology are listed below:

Microbiology

Professor and Chairman: Hetrick.
Professors: Colwell, Doetsch, Faber (Emeritus),

Latfer, Pelczar, Young.
Associate Professors: Cook, MacQuillan, Roberson, Weiner.
Assistant Professors: Howard, Voll.
Lecturers: Krichevsky (p.t.), Morris (p.t.), Stadtman (p.t.).
Instructor: Howell.

The Department of Microbiology has as its primary aim providing the student with thorough and rigorous training in microbiology. This entails knowledge of the basic concepts of bacterial cytology, physiology, taxonomy, metabolism, and genetics, as well as an understanding of the biology of infectious disease, immunology, general virology, and various applications of microbiological principles to public health and industrial processes. In addition, the department pursues a broad and vigorous program of basic research, and encourages original thought and investigation in the above-mentioned areas.

The department also provides desirable courses for students majoring in allied departments who wish to obtain vital, supplementary information. Every effort has been made to present the subject matter of microbiology as a basic core of material that is pertinent to all biological sciences.

The curriculum outlined below, which leads to a bachelor's degree, includes the basic courses in microbiology and allied fields.

A student planning a major in microbiology should consult a departmental advisor as soon as possible after deciding upon this action. The supporting courses should be chosen only from the biological and physical sciences.

No course with a grade less than C may be used to satisfy major requirements.

Information concerning the Honors Program may be obtained in the departmental office.

The major in the department consists of a minimum of twenty-four semester hours, including MICB 200 — General Microbiology (4), and MICB 440 — Pathogenic Microbiology (4). In addition, at least sixteen additional hours must be selected from MICB 290 — Applied Microbiology (4), MICB 300 — Microbiological Literature (1), MICB 330 — Microbial Ecology (2), MICB 380 — Microbial Genetics (4), MICB 388 — Special Topics (1-4), MICB 399 — Microbiological Problems* (3), MICB 400 — Systematic Microbiology (2), MICB 410 — History of Microbiology (1), MICB 420 — Epidemiology and Public Health (2), MICB 430 — Marine Microbiology (2), MICB 431 — Marine Microbiology Laboratory (2), MICB 450 — Immunology (4), MICB 460 — General Virology (4), MICB 470 — Microbial Physiology (4), MICB 490 — Microbial Fermentations (2), MICB 491 — Microbial Fermentations Laboratory (2).

MICB 322 — Microbiology and the Public (3) is a general survey course and is not open to majors in the biological sciences.

*MICB 399 may be used only once towards meeting the major requirements.

Required as courses supporting the major are CHEM 103, 104 (4,4), 201 (3), 202 (2), 203 (3), 204 (2) College Chemistry (with laboratories) I, II, III, and IV; CHEM 462, 463 (3,3) Biochemistry; MATH 110, 111 — Introduction to Mathematics (3,3) or equivalent; PHYS 121, 122 — Fundamentals of Physics (4,4); ZOOL 101 — General Zoology (4) and four additional semester hours in a biological science. (MATH 220, 221 — Introductory Calculus (3,3) or equivalent is strongly recommended but not required.)

Course Code Prefix—MICB

Zoology

Professor and Chairman: Corliss.
Assistant Chairman: Haley.
Professors: Anastos, Brinkley, Brown, Clark, Grollman, Haley, Highton, Jachowski, Morse, Schleidt.
Associate Professors: Barnett, Contrera, Goode, Imberski, Levitan, Linder, Pierce, Potter, Small, Vermeij.
Assistant Professors: Allan, Bonar, Buchler, Carroll, Gill, Higgins, Reaka.
Research Assistant Professor: Morton.
Instructors: Bartberger, Cole, Knox, Piper, Spalding.
Visiting Professors. Eisenberg,* Otto.*

*Adjunct members of the faculty

I. Description of Program. The Department of Zoology offers a program leading to a B.S. with a major in Zoology. The program is planned to give each student an appreciation of the diversity of the problems studied by zoologists and an opportunity to explore, in detail, the kinds of problems delineating the specialized fields of Zoology and the nature of observation and experimentation appropriate to investigations within these fields. The requirements of 26 hours in Zoology, including one course in each of four broad areas, together with supporting courses in Chemistry, Mathematics, and Physics, permit students to develop their interests in the general field of Zoology or to concentrate in a special area. Courses in Zoology satisfying the broad area requirements are offered at the sophomore and junior-senior levels and may be taken upon completion of the prerequisites for a chosen course. Majors are urged to complete the required supporting course in Chemistry, Mathematics, and Physics as early as possible since these courses are prerequisites for many courses in Zoology.

II. Curriculum For Zoology Majors. There are no specified courses in zoology required of all majors. ZOOL 101, General Zoology, is available for students who need an introductory course before proceeding to more advanced zoology courses. Competence equivalent to the successful completion of ZOOL 101 is prerequisite to all zoology courses that are accepted for credit toward the major. Credits earned in ZOOL 101 are not accepted for credit toward the major.

All majors are required to complete a minimum of 26 credit hours in Zoology with an average grade of C. Fourteen of the twenty-six hours must be earned in 300-400 level courses and two of these courses must have accompanying laboratories. Most Zoology courses that are accepted for credit toward the major have been grouped into four broad areas based upon the level of biological organization studied. The areas and their corresponding courses are: I, cells and cell organelles; II, tissues, organs and organ systems; III, organisms; and IV, populations and communities of organisms. One 3 or 4 credit course in each of these areas is required. ZOOL 271 must accompany ZOOL 270, and ZOOL 471 must accompany ZOOL 470 for these courses to fulfill the Area IV requirement.

AREA I
- ZOOL 246—Genetics (4)
- ZOOL 411—Cell Biology (3)
- ZOOL 413—Biophysics (3)
- ZOOL 415—Cell Differentiation (3)
- ZOOL 446—Molecular Genetics (3)
- ZOOL 447—Experimental Genetics (4)

AREA II
- ZOOL 201—Human Anatomy and Physiology I (4)
- ZOOL 202—Human Anatomy and Physiology II (4)
- ZOOL 421—Neurophysiology (4)
- ZOOL 422—Vertebrate Physiology (4)
- ZOOL 426—General Endocrinology (3)
- ZOOL 495—Mammalian Histology (4)

AREA III
- ZOOL 102—The Animal Phyla (4)*
- ZOOL 230—Developmental Biology (4)
- ZOOL 290—Comparative Vertebrate Morphology (4)
- ZOOL 293—Animal Diversity (4)*
- ZOOL 430—Vertebrate Embryology (4)
- ZOOL 472—Protozoology (4)
- ZOOL 475—General Parasitology (4)
- ZOOL 477—Symbiology (2)
- ZOOL 481—Biology of Marine and Estuarine Invertebrates (4)
- ZOOL 482—Marine Vertebrate Zoology (4)
- ZOOL 483—Vertebrate Zoology (4)
- ZOOL 492—Form and Pattern in Organisms (3)

*Credit for only 1 course, either ZOOL 102 or ZOOL 293, is permitted.

AREA IV
ZOOL 270—Population Biology and General Ecology (3)
ZOOL 271—Population Biology and General Ecology Laboratory (1)
ZOOL 440—Evolution (3)
ZOOL 444—Advanced Evolutionary Biology (3)
ZOOL 460—Ethology (3)
ZOOL 461—Ethology Laboratory (3)
ZOOL 470—Advanced Animal Ecology (2)
ZOOL 471—Laboratory and Field Ecology (2)
ZOOL 480—Aquatic Biology (4)

Additional courses to complete the required 26 hours in Zoology may be selected from any of the undergraduate courses in Zoology except ZOOL 101, General Zoology (4); ZOOL 146, Heredity and Man (3); ZOOL 181, Ecology of the Oceans (3); and ZOOL 207S, Development of the Human Body (2).

In addition to the above courses, students may submit a total of seven credits earned in the following courses toward the 26 hour requirements.
ZOOL 205—History of Zoology (1)
ZOOL 206—Zoological Literature (1)
ZOOL 209—Basic Study in Zoology (1-4)
ZOOL 319—Special Problems in Zoology (1-2)
ZOOL 328—Selected Topics in Zoology (1-4)

Up to seven hours of credit in ZOOL 319, Special Problems in Zoology, and ZOOL 328, Selected Topics in Zoology may be used to fulfill the fourteen required hours at the 300-400 level providing all other requirements are met.

Students participating in the General or Departmental Honors Programs may submit credits earned in the following courses toward the 26 hours requirement.
ZOOL 308H—Honor Seminar (1)
ZOOL 309H—Honors Independent Study (1-4)
ZOOL 318H—Honors Research (1-2)

III. Required Supporting Courses.
1. CHEM 103, 104, College Chemistry I and II (4,4) or CHEM 105, 106, Principles of College Chemistry I and II (4,4).
2. CHEM 201, 202, College Chemistry III and Laboratory III (3,2) or CHEM 211, 212, Principles of College Chemistry III and Laboratory III (3,2).
3. Mathematics through one year of calculus; i.e., completion of MATH 220, 221, Elementary Calculus (3,3) or MATH 140, 141, Analysis I, II (4,4).
4. Physics 121, 122, Fundamentals of Physics (4,4) or Physics 141, 142, Principles of Physics (4,4).
5. One of the following courses:
   AGRI 301—Introduction to Agricultural Biometrics (3)
   AGRI 401—Agricultural Biometrics (3)
   CHEM 203, 204—College Chemistry IV and Laboratory IV (3,2)
   MATH 240—Linear Algebra (4)
   PSYC 200—Statistical Methods in Psychology (3)
   SOCY 201—Introductory Statistics for Sociology (3)
   STAT 250—Introduction to Statistical Models (3)
   STAT 400—Applied Probability and Statistics I (3)
   STAT 464—Introduction to Biostatistics (3)

IV. Advisement. Although sample programs for Zoology majors interested in different fields may be obtained from the Zoology office, it is strongly recommended that all majors consult a Zoology Department advisor at least once every year. Majors planning to specialize in a particular field of Zoology should satisfy the area requirements during their freshman and sophomore years and take the 400 level courses in their chosen specialty. Students desiring to enter graduate study in certain areas of Zoology should take Biochemistry, Physical Chemistry, Advanced Statistics, Advanced Mathematics, and/or Philosophy of Science as a part of their undergraduate electives. Courses of interest to Zoology majors in Animal Science, Anthropology, Botany, Electrical Engineering, Entomology, Geography, Geology, Microbiology, and Psychology are listed in the Undergraduate Catalogue under the appropriate departments.

V. Honors. The Department of Zoology also offers a special program for the exceptionally talented and promising student. The Honors Program emphasizes the scholarly approach to independent study. Information regarding this program may be obtained from the departmental office or from the chairman of the Zoology Honors Program.

Course Code Prefix—ZOOL

The Division of Arts and Humanities

The Division of Arts and Humanities offers its students a variety of educational opportunities in addition to the traditional liberal education associated with humanistic studies, including possibilities for interdisciplinary and multi-disciplinary programs, independent and general study programs, and special intensive programs designed to meet individual student needs. Students electing to major in one of the creative or performing arts may choose between an academically oriented and a professionally oriented program. The Division also serves the needs of students from the other four academic divisions who wish to elect courses in the arts and humanities.

The units in the Division are: School of Architecture, College of Journalism, American Studies Program, Department of Art, Department of Classical Languages and Literatures, Department of Dance, Department of English, Department of French and Italian Languages and Literatures, Department of Germanic and Slavic Languages and Literatures, Department of History, Department of Music, Oriental and Hebrew Program, Department of Philosophy, Department of Spanish and Portuguese Languages and Literatures, and Department of Speech and Dramatic Art.

Entrance Requirements. The student who intends to pursue a program of study in the Division of Arts and Humanities should include the following subjects in a high school program: College Preparatory Mathematics (Algebra, Plane Geometry), three or four units; Foreign Language, two or more units; Biology, Chemistry or Physics, two units; History and Social Sciences, one or more units. Students lacking such high school preparation may still pursue an education in the Division by making up for such deficiencies through course work or independent study on the College Park Campus.

Students wishing to major in one of the creative or performing arts are encouraged to seek training in the skills associated with such an area prior to matriculation. Students applying for entrance to these programs may be required to audition, present slides or a portfolio as a part of the admission requirements. Entrance requirements for the School of Architecture and the College of Journalism are given below.

Degrees. Students who satisfactorily complete Division requirements are awarded the degree of Bachelor of Arts. Those who complete satisfactorily a special pre-professional program in the Department of Music are awarded the degree of Bachelor of Music. The School of Architecture awards the Bachelor of Architecture degree; the Bachelor of Science is awarded by the College of Journalism.

General Requirements for All Degrees:
A. A minimum of 120 semester hours (161 in Architecture) with at least a C average.
B. General University Requirements
C. Division, College, or School degree requirements
D. Major requirements

The following Division requirements apply only to students earning Bachelor of Arts degrees from the Division of Arts and Humanities. For information concerning other degree programs within the Division (Bachelor of Architecture in the School of Architecture, Bachelor of Science in the College of Journalism, and Bachelor of Music in the Department of Music), the student should consult advisors in those units.

Division Requirements

Note: These requirements are to apply until new policies of the Division of Arts and Humanities are published.

Foreign Language. Demonstration of proficiency equivalent to the level achieved by completion of the first 12 semester hours study of a foreign language.

a. This requirement may be met by students who have successfully completed level three in high school in one foreign language or level two in each of two foreign languages.
b. A student who does not meet the requirements under paragraph a, must show proficiency through the intermediate level of college language. This may be done as follows:
   1. Take the placement examination in the language in which he has background, begin at the college level indicated by the test, and continue through the intermediate level; or
   2. Pass the proficiency test for intermediate level given by the respective language departments.

The languages which may be offered to meet this requirement are Chinese, French, German, Greek, Hebrew, Italian, Japanese, Latin, Portuguese, Russian, Spanish, and Swahili.

Normally a student shall not be permitted to repeat a foreign language course below the 200 level for credit if he has successfully completed a higher numbered course than the one he wishes to repeat.

Speech. Successful completion of *one* of the following courses in speech communication: SPCH 100, 107, 125, 220, or 230. Students who have successfully completed a full unit of speech in high school shall be deemed to have satisfied the speech requirement.

Major Requirements. Each student chooses a field of concentration (major). He may make this choice as early as he wishes; however, once he has earned 56 hours of acceptable credit he *must* choose a major before his next registration.

In programs leading to the baccalaureate degree, the student must also have a secondary field of concentration (supporting courses). The courses constituting the major and the supporting courses must conform to the requirements of the department in which the student majors.

The student must have an average of not less than C in the introductory courses in the field in which he intends to major.

A major shall consist, in addition to the lower division departmental prerequisites, of 24-40 hours, at least twelve of which must be in courses numbered 300 or 400 and at least twelve of which must be taken at the University of Maryland.

Each major program includes a group of "supporting courses," formerly called minors, that are designed to contribute a better understanding of the major. The nature and number of these courses are under the control of the major department.

The average grade of the work taken for the major must be at least C; some departments will count toward satisfaction of the major requirement no course completed with a grade of less than C. The average grade of the work taken in the major and supporting courses combined must be at least C. A general average of C in courses taken at the University of Maryland is required for graduation.

Courses taken to fulfill General University Requirements may not be used toward divisional, major, or supporting course requirements.

Advisors. Freshmen students will be assigned faculty advisors to assist them in the selection of courses and the choice of a major. After selecting a major, sophomore students and above will be advised by faculty members in the major department.

Students in the School of Architecture and College of Journalism should consult their deans.

Certification of High School Teachers. If courses are properly chosen in the field of education, a prospective high school teacher can prepare for high school positions, with a major and supporting courses in certain of the departments of this Division. A student who wishes to work for a teacher's certificate must consult the College of Education in the second semester of the sophomore year and apply for admission to the "Teacher Education" program.

Honors. Departmental Honors Programs are offered in the Departments of English, French, German, History, Music, Philosophy, Spanish, and Speech. Departmental Honors Programs are administered by an Honors Committee within each department. Admission to a Departmental Honors Program ordinarily occurs at the beginning of the first or second semester of the student's junior year. As a rule, only students with a cumulative grade point average of at least 3.0 are admitted. A comprehensive examination over the field of the major program is given to a candidate near the end of the senior year. On the basis of the student's performance on the Honors Comprehensive Examination and in meeting such other requirements as may be set by the Departmental Honors Committee, the faculty may vote to recommend the candidate for the appropriate degree with (departmental) honors or for the appropriate announcement in the commencement program and by citation on the student's academic record and diploma.

Students in the Departmental Honors Programs enjoy some academic privileges similar to those of graduate students.

Kappa Tau Alpha. The Maryland chapter of Kappa Tau Alpha was chartered in 1961. Founded in 1910, this national honor society has 39 chapters at universities offering graduate or undergraduate preparation for careers in professional journalism. It is dedicated to recognition and promotion of scholarship in journalism. Among its activities is an annual award for an outstanding piece of published research in journalism and mass communications. (Also see College of Journalism.)

Phi Beta Kappa. Phi Beta Kappa is the oldest and most widely respected honorary fraternity in the United States. Invitation to membership is based not only on outstanding scholastic achievement, but also on breadth of liberal arts studies completed while enrolled at the University of Maryland. Gamma of Maryland chapter has liaison faculty members in the various departments in the Division of Arts and Humanities with whom students may discuss membership selection. It should be kept in mind that requirements for national honorary societies, such as completion of language and mathematics courses, often differ from the local college, division or university requirements.

Schools and Colleges of the Division of Arts and Humanities

School of Architecture

The School of Architecture offers a five-year undergraduate professional program leading to the degree, Bachelor of Architecture. Future plans include development of other environmental design programs at the graduate and undergraduate level.

The School was awarded accreditation by the National Architectural Accreditation Board, June 1972, insuring that past, present, and future students will be eligible for registration in all 50 states upon meeting experience requirements and passing the standard examination.

The School is an associate member of the Association of Collegiate Schools of Architecture, and is assigned to that organization's northeastern region.

The curriculum presents the basic requisite skills and the opportunity to develop the knowledge to begin professional work. The School's goal is to prepare students for professional service in helping solve the nation's environmental problems.

Opportunities in Architecture. A rapidly growing population, together with expanding industrial development, has taxed the resources of cities

throughout the world. Large segments of these urban populations are overcrowded, under-serviced and deprived of many of the amenities which city life has provided in the past. Many cities find themselves on the edge of economic, political and social disaster. Whole ethnic, racial and economic groups live in a continuing situation of frustration. This urban crisis, which has come into being over the last generation, promises to dominate our domestic life in the United States for at least the generation to come.

The complexity of these problems, precluding easy attribution of causes and simple solutions, has generated great change in the environmental design professions and in the other social disciplines. Where they once stood apart, they are now committed to a common purpose. Each of them has come to recognize the worth and value of the techniques and insights of the others.

In architecture, these exchanges have influenced procedures, services and goals of the profession. Recent years have seen the introduction of the ideas of urban sociology and the behavioral sciences into the area of professional concern, and the inclusion into professional procedures of linear programming, computer technology, operations research, mathematical and gaming simulation, and the use of analog models. The scope of architectural services, once confined to the design, supervision and construction of buildings, has been broadened to include programming, developmental planning operations research, project feasibility studies, and other new professional activities. Finally, the role of the architect is expanding from a narrow concern with building design to a broad concern for developmental change, and his or her goal has developed from a preoccupation with beauty to a commitment to contribute to the enhancement of the quality of life.

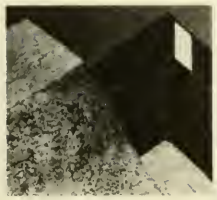
These facts illustrate both the great need for educated and trained professionals, and the relevancy and excitement which characterize the profession today. Perhaps at no time in history has architecture posed as great a challenge, or offered so great a promise of personal fulfillment to its practitioners. There are many opportunities for employment and careers in architectural practice. Additional education and experience also qualify a graduate for a career in city or regional planning.

The general nature of an architectural education is such that some graduates elect and achieve successful careers in civil service, commerce or industry.

Curriculum. The program permits students to enter the School of Architecture either directly from high school or after one year of general college work without extending the time required for completion of degree requirements.

Students in the first year may take an introductory course in architecture as well as general courses. In the second year, the student begins professional education in basic design and building construction as well as continuing his/her general education. The basic environmental design studio explores specific architectural problems as well as the general problems inherent in making objects and spaces. In the third year, coordinated courses in building design and technology introduce the student to the ecological, physiographic, physiological, social, and physical generators of architectural design. In the fourth year, this process is continued, but the emphasis is on urban design: the environmental context, the historical and situational context, urban systems, and theoretical, aesthetic and sociological considerations. In the fifth year of design, the student is offered an opportunity to choose a comprehensive topical problem from several offered each year, or to work independently. Special studies in technical areas as well as building design and case studies in urban planning may be included.

All of the design studio courses emphasize environmental design problem-solving experiences, as well as lectures, reading assignments, and field trips that advance the student's skills. In addition to the design and technical courses, the student is required to take architectural history, physics, mathematics, and a distribution of elective courses.



The general requirements of the University apply to the architecture program. In addition, students are specifically required to complete a mathematics series terminating with MATH 221. Most students find it necessary to begin college mathematics with MATH 115, followed by MATH 220 and 221. In addition, architecture students are required to complete PHYS 121.

Location. The School is housed in a contemporary air-conditioned building on the campus about 10 miles from Washington, D.C. and 30 miles from Baltimore, Maryland. This location, in the center of a large urban concentration, offers many opportunities for the School's program and the student's growth.

The School of Architecture building provides studio space, a library, exhibit space, a shop, a photo lab, classrooms, and lecture hall facilities.

Library. The Architecture Library at present comprises some 17,000 volumes, providing resources in building technology, urban planning, and landscape architecture, as well as in architecture. It includes a rare book collection and a special collection on world expositions. It is expected that the library will number 20,000 volumes by 1978. This will make it one of the major architectural school libraries in the nation. The library subscribes to about 150 foreign and domestic periodicals.

Visual Aids. The visual aids library comprises about 75,000 35-mm color slides in architecture, landscape architecture, and urban planning. Slides of student work, films, film-strips and photographs are included in the collection. Visual aid equipment is available for classroom use.

Admission. Because there is a fixed limit to the number of candidates who can be admitted each year, it is important that the following instructions be carefully followed:

1. Students applying from high school: write the Director of Admissions, University of Maryland, College Park, Md. 20742 for application instructions.
2. Students who have completed work at other universities: write the Director of Admissions, University of Maryland, College Park, Md. 20742 for application instructions.
3. Students transferring from other colleges or divisions of the University of Maryland: pick up an application form at the School of Architecture and return it to the assistant dean of the School, together with a record of all work taken at the University of Maryland and other institutions.

Deadlines: All application procedures should be submitted to the University by March 1. Applications received after this date, but before the University deadline dates for new students and for transfer students, will be considered only on a space-available basis.

Financial Assistance. For promising young men and women who might not otherwise be able to attend the University's School of Architecture, a number of grants and scholarships are available, some earmarked specifically for architectural students. New students must apply before March 15. Students already enrolled may apply before May 1. All requests for information concerning these awards should be made to: Director, Student Aid, University of Maryland, College Park, Md. 20742.

Architecture Faculty

Professor and Dean: Hill.
Assistant Dean: Fogle.
Professors: Cochran (Visiting), Schlesinger, Skiadaressis (Visiting), Wiebenson.
Associate Professors: Degelman, Hutton, Lazaris, Lewis, W. H. Potts, Schaeffer.
Assistant Professors: Bechhoefer, Fullenwider, Jadin, McKay, Senkevitch, Vann.
Lecturers: Bullock, Cass, Feild, Fogle, Kramer, W. D. Potts, Schwartz, Wilkes.

Students in architecture are required to complete a minimum of 161 credits of work for the Bachelor of Architecture degree. In addition to prescribed courses in the School of Architecture, students are required to complete a number of credits in electives offered elsewhere in the University. The requirements for graduation are tabulated below:

1st Year

Arch 170 Intro. to Built Environment	3	GUR[2]	3
GUR[2]	3	GUR[2]	3
GUR[2]	3	GUR[2]	3
GUR[2]	3	GUR[2]	3
Elective	3	Elective	3
	15		15

2nd Year

Arch 200 Basic Env. Design	4	Arch 201 Basic Env. Design	4
Arch 220 Hist of Arch I	3	Arch 221 Hist of Arch II	3
Arch 214 Bldg. Const. I	2	Arch 215 Bldg Const. II	2
Phys 121	4	Elective	3
Math 221	3	Elective	3
	16		15

3rd Year

Arch 300 Arch Studio I	4	Arch 301 Arch Studio II	4
Arch 310 Arch Sci. and Tech I[1]	4	Arch 311 Arch Sci. and Tech II	4
Arch 360 Site Analysis	3	Arch 342 Studies in Visual Design	3
Arch Hist or Theory Option	3	Arch Hist or Theory Option	3
Arch 314 or CMSC 103	3	GUR[2]	3
	17		17

4th Year

Arch 400 Arch Studio III	4	Arch 401 Arch Studio IV	4
Arch 410 Arch Sci. and Tech III	4	Arch 411 Arch Sci. and Tech IV	4
Arch 350 Theory of Urban Form	3	GUR[2]	3
GUR[2]	3	Elective	3
Elective	3	Elective	3
	17		17

5th Year

Arch 500 Advanced Topical Problems	6	Arch 501 Advanced Topical Problems	6
Arch 570 Prof. Mgmt.	2	Elective	3
Arch 502 Thesis Pro-Seminar	3	Elective	3
Elective	3	Elective	3
Elective	3		
	17		15

Total Credits: 161

NOTE At least 12 of the 39 elective credits must be taken outside the School of Architecture and 12 taken from elective courses offered in the School of Architecture (not counting courses taken to meet the Arch History or Theory option).

[1]Physics 121 and Math 221 are prerequisites to Arch 310; Math 221 has a prerequisite of Math 220
[2]GUR — General University Requirements

Course Code Prefix — ARCH

College of Journalism

The College of Journalism at the University of Maryland stands at the doorstep of the Nation's Capitol and the world's news center. It is an ideal location for the study of journalism, public relations, and mass communications because many of the world's important journalists, great news events, and significant communications activities are near at hand.

The College is within easy reach of five of the nation's top 20 newspapers: the *Baltimore Sun*, the *Baltimore News-American*, the *Washington Post*, the *Washington Star-News*, and the production offices of the *Wall*

Street Journal. The College also has easy access to the Washington press corps — the large bureaus of the Associated Press, United Press International, *New York Times,* and many other American and foreign newspapers; also major networks and broadcasting news bureaus such as NBC, CBS, and ABC; also news, business, and special-interest magazines, and representatives of the book publishing industry.

The College is close to the sources of news, including the White House, executive departments and agencies, Supreme Court, and Congress. It is near many major non-governmental representative bodies such as associations, scientific and professional organizations, foreign representatives, and international agencies.

The College has six primary objectives: 1) to insure a liberal education for journalists and mass communicators; 2) to provide professional development, including training in skills and techniques necessary for effective communication; 3) to increase public understanding of journalism and mass communication; 4) to advance knowledge through research and publication; 5) to raise the quality of journalism through critical examination and study; and 6) to provide continuing relationship with professional journalists and their societies.

The College curricula in news editorial journalism and public relations are accredited by The American Council on Education for Journalism. The College is a member of the American Association of Schools and Departments of Journalism, The Association for Education in Journalism, and The American Society of Journalism School Administrators.

Student journalism organization chapters include the Society of Professional Journalists (Sigma Delta Chi), Women in Communication, Pi Delta Epsilon, Kappa Tau Alpha, Kappa Alpha Mu, and a charter chapter of the Public Relations Student Society of America.

The College offers specialized work in news reporting and editing, public relations, advertising, news broadcasting, news photography, and communication theory and research.

The College maintains close liaison with student publications and communications, including the student daily newspaper, yearbook, feature magazine, course guide, literary magazine, campus radio station, and campus television workshop.

The College also arranges summer internships in professional work and part-time on-the-job training opportunities.

Advanced journalism students have many opportunities for professional work in the journalism field. The Journalism Semester Program allows students to take a concentrated semester of work in journalism during which time they produce a bi-weekly newspaper, the *College Park Citizen Call.* Advanced news reporting students have the opportunity to work on the *Montgomery Journal* covering real news assignments for publication. In addition, advanced and graduate students often use the Washington, D.C. resources for both study and professional work experience. Some seminars meet at the National Press Club in downtown Washington.

Students may declare their intention to major in journalism at the beginning of any semester, but normally this is done before their junior year. Students select and work with one faculty member as their advisor during the course of their study at the University.

Typing ability and English proficiency are required of all students. Majors must maintain a C average in courses taken in the College. Students must receive at least a C in Journalism 200 and 201 before they will be allowed to major in Journalism.

Journalism Faculty

Professor and Dean: Hiebert.
Assistant to the Dean: Truitt.
Professors: Bryan, Martin, Newsom.
Associate Professors: Grunig, Petrick, Sommer.
Assistant Professors: Beasley, Geraci, Hesse, Hoyt, Lee.
Instructors: Perruso, Silver.

Requirements for the Journalism Major. The requirements for graduation are given below:

I. *General University Requirements.*

II. *College Requirements:*
- A. MATH 110 (or other higher MATH course approved by advisor).
- B. Foreign Language: through intermediate level (104 or 115). Instead of language, the student may wish to take the Math option, consisting of 9 hours — one course in intermediate Math, one in statistics, and one in Computer Science.
- C. Speech Communication (three credits; oral communication preferred).
- D. Social Sciences (twelve credits; a minimum of three credits in each of the following categories:
  1. Sociology or Anthropology (preferably social problems or organization).
  2. Psychology (preferably general principles or social).
  3. Economics (preferably general principles).
  4. Government and Politics (preferably American government or principles of government).

III. *Professional Requirements:*

JOUR 200 and 201 are required of all Journalism majors. In addition, 24 credit hours in upper division journalism courses, including JOUR 310, News Editing, are required.

At least six credit hours should be taken in one of the following sequences for depth in a special field of journalism:

JOUR 320 and 321 — News Editorial
JOUR 330 and 331 — Public Relations
JOUR 340 and 341 — Advertising
JOUR 350 and 351 — News Photography
JOUR 360 and 361 — News Broadcasting

All journalism majors should elect at least six credit hours from the following courses for breadth in mass communication:

JOUR 400 — Law of Mass Communication
JOUR 410 — History of Mass Communication
JOUR 420 — Government and Mass Communication
JOUR 430 — Comparative Mass Communcation Systems
JOUR 440 — Public Opinion and Mass Communication

IV. Non-Journalism Requirements:

12-18 credit hours in upper-division courses in one subject outside of the College of Journalism.

12-18 credit hours of upper-division, non-journalism electives, to be spread or concentrated according to individual needs.

Minimum upper-division credits for graduation.....57
Total Lower and Upper-Division.....120

Course Code Prefix—JOUR

Departments, Programs and Curricula

American Studies Program

Associate Professor and Chairman: Lounsbury.
Professors: Beall, Browne.
Associate Professor: Mintz.

The program offers a comprehensive, interdisciplinary investigation of American culture as defined in historical and contemporary sources. Majoring in a curriculum of generous breadth — ranging from creative self-expression to environmental studies and the mass media — the undergraduate student may benefit from the perspectives emphasized by specialists in both the humanities and the social sciences. In addition to gaining a general awareness of the multiple dimensions of American civilization, each major is expected to select an area of concentration in either American literature or American history. The program's faculty provide

integrative courses, designed to offer a conceptual framework for the diversified materials of the traditional disciplines, in the student's junior and senior years.

The undergraduate major requires 48 semester hours (24 hours minimum at the 300-400 level), consisting of courses in American Studies and various related disciplines. Courses applicable to American Studies are offered in the following departments, programs, schools and colleges:

English, History, Government and Politics, Sociology, Afro-American Studies, Anthropology. Architecture, Art, Comparative Literature, Dramatic Arts, Economics, Education, Geography, Journalism, Music, Philosophy, Psychology, Radio-Television-Film, and Speech Communication.

No course with a grade lower than C may be counted towards the major.

A major in American Studies will follow this curriculum:

1. AMST 201, 202 (Introduction to American Studies) in the freshman or sophomore year; AMST 426, 427 (Culture and the Arts in America) or AMST 436, 437 (Readings in American Studies) in the junior year; and AMST 446, 447 (Popular Culture in America) in the senior year.
2. Twelve hours of either American literature or history.
3. Nine hours in each of two of the remaining above listed departments.

Note. To meet one of the nine hour requirements, a student, with the approval of his advisor, may substitute related courses from one of the following sequences:

Afro-American Studies. Courses in art, English, government, history and sociology.

Area Studies and Comparative Culture. The study of one foreign culture. Courses must be drawn from at least two of the following fields: art, comparative literature, English, history, and a foreign language.

Creative and Performing Arts. Production, studio or technical courses in art, English, music, radio and television.

Personality and Culture. Courses in anthropology, education, and psychology.

Philosophy and Fine Arts. Courses in art, music and philosophy.

Popular Arts and Mass Communications. Courses in dramatic arts, journalism, radio-television-film.

Urban and Environmental Studies. Courses in architecture, economics, government, sociology.

Women's Studies. Courses in English, government, history, and sociology.

Course Code Prefix—AMST

Art

Professor and Chairman: Levitine.
Professors: Bunts, A. deLeiris, Denny, Jamieson, Lembach, Lynch, Maril, Rearick.
Associate Professors: Campbell, DiFederico, Forbes, Klank, Lapinski, Niese, Pemberton, Stites.
Assistant Professors: Bickley, Farquhar, Gelman, Green, Johns, Reid, Spiro, Wheelock, Withers.
Lecturers: Balse, Borris, deMonte, Ferraioli, Hommel, Landgren, Puryear, Truitt, Willis.
Instructors: M. deLeiris, Samuels.

Two majors are offered in art: art history and studio. The student who majors in art history is committed to the study and scholarly interpretation of existing works of art, from the prehistoric era to our times, while the studio major stresses the student's direct participation in the creation of works of art.

In spite of this difference, both majors are rooted in the concept of art as a humanistic experience, and share an essential common aim: the development of aesthetic sensitivity, understanding, and knowledge. For this reason, students in both majors are required to progress through a "common curriculum," which will ensure a broad grounding in both aspects of art; then each student will move into a "specialized curriculum" with advanced courses in his own major.

A curriculum leading to a degree in art education is offered in the College of Education with the cooperation of the Department of Art.

Common Curriculum

(Courses required in major unless taken as part of supporting area as listed below.)
ARTH 100, Introduction to Art. (3)
ARTH 260, History of Art. (3)
ARTH 261, History of Art. (3)
ARTS 100, Design I. (3)
ARTS 110, Drawing I. (3)

Specialized Curricula

Art History Major A
5 junior-senior level History of Art courses (one each from 3 of the following areas: Ancient-Medieval, Renaissance-Baroque, 19th-20th century, non-Western). (15)
1 additional Studio Art course. (3)

Supporting Area
12 coherently related non-art credits approved by an advisor. Six of these credits must be taken in one department, and must be at junior-senior level. (12)

Art History Major B
5 junior-senior level History of Art courses (one each from 3 of the following areas: Ancient-Medieval, Renaissance-Baroque, 19th-20th century, non-Western). (15)
3 additional courses in any level History of Art. (9)

Supporting Area
ARTS 100, Design I (from common curriculum). (3)
ARTS 110, Drawing I (from common curriculum). (3)
2 Studio Art courses at junior-senior level. (6)

Total required credit hours, combined Major and Supporting Area — 45.

Studio Art Major A
ARTS 200, Intermediate Design or alternative. (3)
ARTS 210, Drawing II. (3)
ARTS 220, Painting I. (3)
ARTS 310, Drawing III. (3)
ARTS 330, Sculpture I. (3)
ARTS 340, Printmaking I or ARTS 344, Printmaking II. (3)
1 additional junior-senior level Studio course. (3)
1 advanced History of Art course. (3)

Supporting Area
12 coherently related non-Art credits approved by an advisor. Six of these credits must be taken in one department and must be at junior-senior level. (12)

Studio Art Major B
ARTS 200, Intermediate Design or alternative. (3)
ARTS 210, Drawing II. (3)
ARTS 220, Painting I. (3)
ARTS 310, Drawing III. (3)
ARTS 330, Sculpture I. (3)
ARTS 340, Printmaking I or ARTS 344, Printmaking II. (3)
1 additional junior-senior level Studio Art course. (3)

Supporting Area in History of Art
ARTH 260, History of Art (from common curriculum). (3)
ARTH 261, History of Art (from common curriculum). (3)
2 History of Art courses at junior-senior level. (6)

Total required credit hours, combined Major and Supporting Area — 51 in Major A, 45 in Major B.

No course with a grade less than C may be used to satisfy major requirements.

Course Code Prefixes—ARTE, ARTH, ARTS

Chinese Program

Associate Professor and Director: Chin.
Lecturers: Loh, Chen.

The program offers two series of courses — the language series and the content series. The language series consists of four levels of instruction: the elementary, the intermediate, the advanced, and a level of specialized courses such as Readings in Chinese History and Literature, Classical Chinese, etc. In addition, there is a course entitled Review of Elementary Chinese to bridge the gap between Elementary and Intermediate Chinese for those students who have had some exposure to the language but who are not ready for Intermediate Chinese.

The content series contains courses in Chinese civilization, literature, and linguistics. Except for Chinese Linguistics, which is a sequence dealing with the sounds and grammatical system of the Chinese language and its comparison with English, courses in the content series do not presuppose previous training in the Chinese language. Since the illustrative materials for Chinese Linguistics (CHIN 421, 422) are in Chinese, CHIN 102 or equivalent is required for this sequence.

The elementary Chinese course is intensified, meeting 6 hours per week, for which students receive 12 credits in one year (6 per semester). The intensive program is designed to give students a solid foundation of the language in all four skills of speaking, hearing, reading, and writing (characters). The instructional approach is audio-lingual and communication-oriented.

Presently the program offers a minor in Chinese. It consists of 18 credit hours of which 6 must be in Chinese Linguistics.

Classical Languages and Literatures

Professor and Chairman: Avery.
Associate Professor: Hubbe.
Assistant Professor: Boughner.

Major in Latin: LATN 101, 102, 203 and 204 or their equivalent must have been completed before a student may begin work on a major. A major consists of a minimum of twenty-four hours beginning with LATN 305, twelve hours of which must be taken in 400-level courses. In addition, a student majoring in Latin will be required to take as supporting courses LATN 170, HIFN 456, and HIFN 457. The student is urged to pursue a strong supporting program in Greek. The following courses are recommended as electives: HIST 151 and 152, ARTH 402 and 403, and PHIL 310. No course in the Latin language with a grade less than C may be used to satisfy major requirements.

Normally no placement tests are given in the classical languages. The following schedule will apply in general in determining the course level at which students will register for Latin.

Students offering 0 or 1 unit of Latin will register for LATN 101.
Students offering 2 units of Latin will register for LATN 203.
Students offering 3 units of Latin will register for LATN 204.
Students offering 4 units of Latin will register for LATN 305.

However, those presenting 2, 3, or 4 units of preparatory work may register initially for the next higher course by demonstrating proficiency through a placement test. Students whose stage of achievement is not represented here are urgently invited to confer with the chairman of the department. Students who wish to continue the study of Greek should likewise confer with the chairman of the department.

Course Code Prefix—LATN, GREK

Comparative Literature Program

Advisory Committee on Comparative Literature: Fink, Goodwyn, Russell, Stern.
Professors: Freedman, Goodwyn, Hering, Jones, Perloff, Salamanca.
Associate Professors: Barry, Berry, Coogan, Fleck, Greenwood, Mack, Smith, Walt.

Undergraduates may emphasize comparative literature as they work toward a degree in one of the departments of literature. Each student will be formally advised by the faculty of his "home" department. In general, every student will be required to take CMLT 401 and CMLT 402, and during his last year, CMLT 496. The various literature departments concerned will have additional specific requirements.

Students emphasizing comparative literature are expected to develop a high degree of competence in at least one foreign language.

Course work may not be limited to the nineteenth and twentieth centuries.

LATN 170 is highly recommended.

Course Code Prefix—CMLT

Dance

Professor: Madden.
Associate Professors: Rosen, Ryder, A. Warren.
Assistant Professors: Frank, Sheppard, L. Warren, Witt.
Instructors: Coles, Freivogel, Rafel, Rooney, Sloan.

The Dance Department offers a basic four year program as a foundation for the dance professions. The curriculum provides opportunities for students interested in performance, choreography, and teaching.

The core program includes at least one modern technique class per semester, plus 24 semester hours of additional dance courses, including basic ballet technique and 12 semester hours in dance related disciplines.

Students may obtain State of Maryland teacher certification by completing certain courses in the College of Education.

No grade less than "C" is accepted in courses required for the major.

There is ample opportunity for performance in departmentally sponsored student workshops, lecture demonstrations, composition courses, student and faculty concerts, and Maryland Dance Theater. The faculty and regular course offerings are complemented by visiting artists-in-residence.

The department strongly recommends that new dance majors enter only in the fall semester of the academic year. Following admission to the University a potential dance major is expected to contact the department for instructions regarding advising, audition for class placement, and registration.

English Language and Literature

Chairman and Professor: Kenny.
Professors: Andrews (Emeritus), Bode, Bryer, Cooley (Emeritus), Corrigan, Fleming (Emeritus), Freedman, Gravely (Emeritus), Hovey, Isaacs, Lawson, Lutwack, McManaway, Manning (Emeritus), Mish, Murphy, Myers, Panichas, Perloff, Russell, Salamanca, Whittemore, Winton.
Associate Professors: Barnes, Barry, Birdsall, S. Brown, Coogan, Cooper, Fry, Greenwood, G. Hamilton, Herman, Holton, Houppert, Howard, Jellema, Kinnaird, Kleine, Mack, M. Miller, Peterson, Smith, Thorberg, Vitzhum, Walt, Ward, Weber (Emeritus), Wilson.
Assistant Professors: Beauchamp, Cate, Chargois, Coletti, Donawerth, Dunn, D. Hamilton, James, Kelly, Kenney, Kimble, Martin, Moore, Nutku, Ousby, Rutherford, Sorum, Van Egmond, Vlach.
Lecturers: J. Miller, Sewell.
Instructors: B. Brown, Buhlig, Conner, Demaree, Ference, Gold, Lynch, Potash, Reggy, Stevenson, Townsend.

The English major requires 36 credits beyond the University composition requirement. For the specific distribution requirements of these 36 credits, students should consult the English Department's advisors (room A2125, ext. 2521). A student may pursue a major with emphasis in English, and American Literature; Comparative Literature, or linguistics; or in preparation for secondary school teaching. Students interested in secondary school teaching should make it known to the department as early in their college career as possible.

No course with a grade less than C may be used to satisfy major requirements.

In selecting supporting or elective subjects, students majoring in English, particularly those who plan to do graduate work, should give special consideration to courses in French, German, Latin, philosophy, history and fine art.

Honors. The Department of English offers an honors program, primarily for majors but open to others with the approval of the Departmental Honors Committee. Interested students should ask for detailed information from an English Department advisor no later than the beginning of their junior year.

Course Code Prefix—ENGL

French and Italian Languages and Literatures

Associate Professor and Acting Chairman: Tarica.
Professors: Bingham, MacBain, Quynn (Emeritus), Rosenfield.
Associate Professors: Demaitre, Fink, Hall.
Assistant Professors: Gilbert, Hicks, Meijer, Russell.
Lecturer: Lloyd-Jones.
Instructors: Barrabini, Bondurant.

The Department offers a major in French which consists of a total of 33 credits of French courses at the 200 level or above. The French major must complete FREN 201, 251, 252, 301, 302, any one of 211, 311, 312, one of 401, 405 and four French courses from those numbered 400 to 499 — one of which must be a literature course. (FREN 478 and 479 may not be counted among the five.) The French major is required to take a further 12 credits in supporting courses from a list approved by the Department. An average grade of C is the minimum acceptable in the major field. Students intending to apply for teacher certification should consult the Director of Undergraduate Advising as early as possible in order to plan their programs accordingly.

Honors. The department offers an honors program in French for students of superior ability. Honors work normally begins in the first semester of the junior year, but a qualified student may enter as early as the sophomore year or as late as the second semester of the junior year. Honors students are required to take at least two courses from those numbered 491H, 492H, and 493H together with 494H, Honors Independent Study, and 495H, Honors Thesis Research. Honors students must take a final comprehensive examination based on the honors reading list. Admission of students to the honors program, their continuance in the program and the final award of honors are the prerogative of the Departmental Honors Committee.

Course Code Prefixes—FREN, ITAL

Germanic and Slavic Languages and Literatures

Professor and Chairman: Stern.
Professors: Best, Hering, Hinderer, Jones.
Associate Professors: Berry, Fleck, Hitchcock, Pfister.
Assistant Professors: Dulbe, Elder, Knoche, Kostovski.

General. Two types of undergraduate majors are offered in German; one for the general student or the future teacher, and the other for those interested in a rounded study of a foreign area for the purpose of understanding another nation through its literature, history, architecture, and other aspects. Both of these majors confer the B.A. degree. The department also offers M.A. and Ph.D. degrees in German language and literature.

An undergraduate major in either category consists of a total of 30 hours in German, 33 in Russian, with a C average, beyond the basic language requirement.

In selecting minor or elective subjects, students majoring in German or Russian, particularly those who plan to do graduate work, should give special consideration to courses in foreign languages, philosophy, history, and English.

Language and Literature Major:

German. Specific minimum requirements in the program are: two courses in advanced language (301-302); two semesters of the survey of literature courses (321-322); six literature courses on the 400 level, two of which may be taken in comparative literature. These literature courses may be replaced by other departmental offerings on the 400 level with the permission of the chairman and/or advisor. Taking honors courses as substitute for the 400 level courses requires special permission from the chairman of the department and in no case may more than two honors courses be selected for this purpose.

Russian. The specific minimum requirements are: one from each set: 201-202, 301-302, 311-312, 401-402; two semesters of the survey of literature courses (321-322), plus 15 hours of courses on the 400 level.

Foreign Area Major:

German. Specific requirements in this major are: two courses in advanced language (301-302); a 2-semester literature survey (321-322); two courses in civilization (421-422); four courses in German literature on the 400 level, two of which may be replaced by two courses in Comparative Literature. These literature courses may be replaced by other departmental offerings on the 400 level with the permission of the chairman and/or advisor. Supporting courses should be selected in consultation with the student's advisor.

Honors. A student majoring in German or Russian who, at the time of application, has a general academic average of at least 3.0 and 3.5 or above in his major field, is eligible for admission to the Honors program of the department. Application should be directed to the chairman of the Honors Committee. Honors work

normally begins in the first semester of the junior year but a qualified student may enter as early as the sophomore year or as late as the second semester of the junior year.

Honors students are required to take two of the Honors reading courses 398H and the independent study course, 397H.

Besides completing an independent study project, all graduating seniors who are candidates for Honors must take an oral examination. Admission of students to the Honors Program, their continuance in the program, and the final award of Honors are the prerogative of the Departmental Honors Committee.

Lower Division Courses. Students with only one year of high school language may take courses 111 and 112 in that language for credit. Students who have had two or more years of German or Russian in high school and wish to continue with that language must take the placement exam.

Students who, as a result of the placement exam, place in 113 must complete 115. They may not take courses 111-112 for credit unless there has been a four-year lapse of time between their high school language course and their first college course in that language. Those who place above 115 have fulfilled the language requirement for the B.A. degree in the Division of Arts and Humanities.

Transfer students with college credit have the option of continuing at the level for which they are theoretically prepared, of taking a placement examination, or of electing courses 113 or 116 for credit. If a transfer student takes 113 for credit, he or she may retain transfer credit *only* for the equivalent of course 111. If he takes 116, he may retain two courses for credit only for the equivalent of courses 111 through 114. A transfer student placing lower than his or her training warrants may ignore the placement but *DOES SO AT HIS OR HER OWN RISK.*

If a student has received a D in a course and completes the next higher course, he or she cannot go back to repeat the original D.

Course Code Prefixes—GERM, RUSS

Hebrew Program

Director and Assistant Professor: Greenberg.
Visiting Professor: Iwry.
Instructors: Klein, Landa, Liberman.

The Hebrew Program provides both beginners and those with previous study of the Hebrew Language an opportunity to become conversant with the 3,000-year development of Hebrew language, literature, and culture.

Elementary and intermediate courses develop the ability to communicate effectively in modern Israeli Hebrew. Courses in composition and conversation emphasize vocabulary enrichment, grammar and syntax of the written and spoken language. On the advanced level the student analyzes the major texts of classical and modern Hebrew literature.

In addition to the 54 credit hours currently offered by the Hebrew Program, the student has available a substantial number of related Jewish Studies courses in the departments of history, English, sociology, etc.

Course Code Prefix—HEBR

History

Professor and Chairman: Rundell.
Professors: Bauer (Emeritus), Brush, Callcott, Cole, Duffy, Foust, Gilbert, Gordon, Haber, Harlan, Jashemski, Kent, Merrill, A. Olson, Prange, E. B. Smith, Sparks, Yaney.
Associate Professors: Belz, Berry, Breslow, Cockburn, Farrell, Flack, Folsom, Giffin, Greenberg, Grimsted, Hoffman, Kaufman, Matossian, Mayo, K. Olson, K. Stowasser, Warren, Wright.
Assistant Professors: Bradbury, Harris, Holum, Lampe, Majeska, McCusker, Nicklason, Perinbam, Ridgway, Ruderman, H. Smith, Spiegel, Williams.
Instructor: Smock.
Lecturers: Moss, B. Stowasser.

The Department of History seeks to broaden the student's cultural background through the study of history and to provide preparation for those interested in law, publishing, teaching, journalism, service, and graduate study.

A faculty advisor will assist each major in planning a curriculum to meet his personal interests. A "program plan," approved by the advisor, should be filed with the Department as soon as possible. Students should meet regularly with their advisors to discuss the progress of their studies.

Major Requirements

A. Candidates for a B.A. in History are required to complete 39 hours in History courses.
B. The undergraduate major must attain a grade of C or higher in each of the courses submitted to fulfill the 39-hour requirement.
C. A minimum of twelve of the 39 hours must be taken at the 300 or 400 level.
D. The only mandatory course is HIST 389, Proseminar in Historical Writing (3 hours).
E. Before registering for HIST 389, the student is required to have demonstrated proficiency in English composition by
   (1) passing (or getting credit by examination in) ENGL 101 or 171 or equivalent, with a grade of C or higher; or
   (2) receiving an appropriate score on the Advanced Placement examination.

Supporting Courses. History majors are required to take nine hours at the 300 or 400 levels in appropriate supporting areas outside the History Department. These courses do not all have to be in the same department but the choice of courses must be approved in writing by a faculty advisor. The grade of C or higher is required in each of the courses submitted to fulfill this requirement.

General University Requirements in History. All History courses on the 100, 200, 300 and 400 levels are open to students seeking to meet the University requirements in Area C (Division of Arts and Humanities) with the exception of HIST 256, 257, 389, 395, 396, 399. A few other courses are open only to students who satisfy specified prerequisites, but that does not limit them to history majors. It should be noted that Special Topics courses — HIST 298, 389 and 498 — are offered on several different subjects of general interest each semester. Descriptions may be obtained from the History Department office.

Honors in History. Students who major or minor in history may apply for admission to the History Honors Program during the second semester of their sophomore year. Those who are admitted to the program substitute discussion courses and a thesis for some lecture courses and take an oral comprehensive examination prior to graduation. Successful candidates are awarded either honors or high honors in history.

The History Department offers *pre-honors* work in American history and in western civilization. Consult *Schedule of Classes* for specific offerings each semester. Students in these sections meet in a discussion group instead of attending lectures. They read widely and do extensive written work on their own. Pre-honors sections are open to any student and are recommended for students in General Honors, subject only to the instructor's approval. Students who intend to apply for admission to the History Honors Program should take

as many of them as possible during their freshman and sophomore years.

Course Code Prefixes—HIST, HIFN, HIUS

Japanese Program

Associate Professor and Director: Chin.
Assistant Professor: Gerbert.

Three semesters of Japanese are now offered. The approach is audio-lingual and communication oriented. The courses are open to all students interested in Japanese and East Asian studies.

Course Code Prefix—JAPN

Music

Professor and Chairman: Troth.
Professors: Berman, Bernstein, Folstrom, Gordon, Heim, Helm, Hudson, Johnson, Moss, Taylor, Traver.
Associate Professors: Fanos, Fleming, Gallagher, Garvey, Head, Horton, McClelland, Meyer, Montgomery, Olson, Pennington, Schumacher, Serwer, Shelley, Snapp, Springmann, True, Wakefield.
Assistant Professors: Barnett, Beatty, Davis, Elliston, Elsing, Etheridge, Gardner, Haley, Kuhn, Payerle, Roesner, Signell, Sutherland, Tallman, Wachhaus, B. Wilson.
Instructors: Jarvis, Mueller, M. Wilson.

The objectives of the department are (1) to help the general student develop sound critical judgment and discriminating taste in the art of music; (2) to provide professional musical training based on a foundation in the liberal arts; (3) to prepare the student for graduate work in the field; and (4) to prepare the student to teach music in the public schools. To these ends, two degrees are offered: the professionally oriented Bachelor of Music, with a major in theory, composition, history and literature, or music performance; and the culturally oriented Bachelor of Arts, with a major in music. The Bachelor of Science degree, with a major in music education, is offered in the Department of Secondary Education in the College of Education; course offerings are described in the sections relating to that department. This degree program is administered within the Music Department.

Courses in music theory, literature and music performance are open to all students who have completed the specified prerequisites, or their equivalents, if teacher time and facilities permit. The University Bands, Chamber Singers, Chapel Choir, Madrigal Singers, Orchestra, University Chorale, and University Chorus, as well as the smaller chamber ensembles, are likewise open to all qualified students.

The Bachelor of Music Degree. The curriculum leading to the degree of Bachelor of Music is designed for students who wish to prepare for a professional career in music. Extensive pre-college experiences in music are expected. A description of the variety of available majors is available in the departmental office. A grade of C or above is required in each major course.

Bachelor of Music (Perf.: Piano)

Sample Program

Freshman Year	Fall	Spring
MUSP 119/120	4	4
MUSC 128	2	2
MUSC 131	3	
MUSC 150/151	3	3
University Requirements	3	6
	15	15

Sophomore Year	Fall	Spring
MUSP 217/218	4	4
MUSC 228	2	2
MUSC 250/251	4	4
University Requirements	5	5
	15	15

Junior Year	Fall	Spring
MUSP 415/416	4	4
MUSC 330/331	3	3
MUSC 328	2	2
Elective		2
University Requirements	6	5
	15	16

Senior Year	Fall	Spring
MUSP 419/420	4	4
MUSC 450	3	
MUSC 492		3
MUSC 467	3	
Electives	6	6
	16	13

The Bachelor of Arts Degree. The curriculum leading to the Bachelor of Arts degree with a major in music is designed for students whose interests are cultural rather than professional. A detailed description of the program and its options is available in the departmental office. A grade of C or above is required in each major course.

Bachelor of Arts (Music)

Sample Program

Freshman Year	Fall	Spring
MUSC 100		2
MUSC 102/103	2	2
MUSC 131	3	
MUSC 150/151	3	3
University Requirements	6	7
MUSC 329	1	1
	15	15

Sophomore Year	Fall	Spring
MUSC 202/203	2	2
MUSC 250/251	4	4
University Requirements	5	6
MUSC Electives	3	2
MUSC 329	1	1
	15	15

Junior Year	Fall	Spring
MUSC 329	1	
MUSC 330/331	3	3
MUSC Electives	5	
Supporting Area		9
University Requirements	6	
Electives		3
	15	15

Senior Year	Fall	Spring
Electives	12	15
MUSC 450	3	
	15	15

Course Code Prefixes—MUSC, MUED, MUSP

Philosophy

Professor and Chairman: Gorovitz.
Professors: Pasch, Perkins, Schlaretzki, Shapere, Svenonius.
Associate Professors: Brown, Celarier, Johnson, Lesher, Martin, Suppe.
Assistant Professors: Ahern, Darden, Gardner, Kress, Odell, Stern, Waldner.

The undergraduate course offerings of the Department of Philosophy are, as a group, intended both to satisfy the needs of persons wishing to make philosophy their major field and to provide ample opportunity for other students to explore the subject. In general, the study of philosophy can contribute to the education of the university student by giving him or her experience in critical and imaginative reflection on fundamental concepts and principles, by acquainting him or her with some of the philosophical beliefs which have influenced and are influencing his own culture, and by familiarizing him or her with some classic philosophical writings through careful reading and discussion of them. The department views philosophy essentially as an activity, which cultivates articulateness, expository skill, and logical rigor. Students in philosophy courses can expect

their work to be subjected to continuing critical scrutiny. Courses designed with these objectives primarily in mind include PHIL 100 (Introduction to Philosophy), PHIL 170 (Elementary Logic and Semantics), PHIL 140 (Ethics), PHIL 236 (Philosophy of Religion), and the historical courses: 207, 305, 310, 320, 325, and 326.

For students interested particularly in philosophical problems arising within their own special disciplines, a number of courses are appropriate: PHIL 233 (Philosophy in Literature), PHIL 246 (Philosophy of Education), PHIL 250 (Philosophy of Science I), PHIL 345 (Social and Political Philosophy I), PHIL 360 (Philosophy of Language), PHIL 330 (Philosophy of Art), PHIL 432 (Topics in Philosophical Theology), PHIL 450 and 451 (Scientific Thought I and II), PHIL 452 (Philosophy of Physics), PHIL 453 (Philosophy of Science II), PHIL 455 (Philosophy of the Social Sciences), PHIL 456 (Philosophy of Biology), PHIL 457 (Philosophy of History), PHIL 458 (Philosophy of Psychology), and PHIL 474 (Induction and Probability).

Pre-law students may be particularly interested in PHIL 140 (Ethics), PHIL 345 and 445 (Political and Social Philosophy I and II), PHIL 440 (Ethical Theory), and PHIL 447 (Philosophy of Law). Pre-medical students may be particularly interested in PHIL 342 (Moral Problems in Medicine), and PHIL 456 (Philosophy of Biology).

The departmental requirements for a major in philosophy are as follows: (1) a total of at least 30 hours in philosophy, not including PHIL 100; (2) PHIL 140, 271, 310, 320, 326, and at least two courses numbered 399 and above; (3) a grade of C or better in each course counted toward the fulfillment of the major requirement.

For students of exceptional ability and interest in philosophy, the department offers an honors program. Information regarding this special curriculum may be obtained from the departmental advisors.

The department presents visiting speakers from this country and abroad in its colloquium series, scheduled throughout the academic year. In addition, members of the department and advanced graduate students lecture on topics of current significance in the Graduate Workshop and in the undergraduate Philosophy Club.

Course Code Prefix—PHIL

Russian Area Program

Director and Student Advisor: Foust, Yaney.

The Russian Area Program offers courses leading to a B.A. in Russian studies. Students in the program study Russian and Soviet culture as broadly as possible, striving to comprehend it in all its aspects rather than focusing their attention on a single segment of human behavior. It is hoped that insights into the Russian way of life will be valuable not only as such but as a means to deepen the students' awareness of their own society and of themselves.

Course offerings are in several departments: language and literature, government and politics, history, economics, geography, architecture, and sociology. A student may plan his or her curriculum so as to emphasize any one of these disciplines, thus preparing for graduate work either in the Russian area or in the discipline.

Students in the program must meet the general degree requirements of the University and division from which they graduate. They must complete 12 hours of basic courses in Russian language (RUSS 111, 112 [or RUSS 121 in place of both 111 and 112], 114, and 115) or the equivalent of these courses taken elsewhere, and they must complete at least 12 more hours in Russian language beyond the basic level (chosen from among RUSS 201, 202, 301, 302, 311, 312, 321, and 322 or equivalent courses). In addition, students must complete 24 hours in Russian area courses on the 300 level or above. These 24 hours must be taken in at least 5 different departments, if appropriate courses are available, and may include language-literature courses beyond those required above.

HIST 237, Russian Civilization, is recommended as a general introduction to the program but does not count toward the fulfillment of the program's requirements.

It is recommended but not required that the student who plans on doing graduate work complete at least 18 hours at the 300 level or above (which may include courses applicable to the Russian Area Program) in one of the above mentioned departments. It is also recommended that students who plan on doing graduate work in the social sciences — government and politics, economics, geography, and sociology — take at least two courses in statistical methods.

The student's advisor will be the program director. The student must receive a grade of C or better in all the above mentioned required courses.

Course Code Prefix—RUSS

Spanish and Portuguese Languages and Literatures

Professor and Chairman: Mendeloff.
Professors: Goodwyn, Gramberg, Marra-Lopez, Nemes, Rand (Emeritus).
Associate Professors: Rovner, Sosnowski.
Assistant Professors: Baird, Igel, Natella.
Instructors: Barilla, Garcia, Hahn, Rentz.

Majors. Two types of undergraduate majors are offered in Spanish: one for the general student or the future teacher; and the other for those interested in a rounded study of a foreign area for the purpose of understanding another nation through its literature, history, sociology, economics, and other aspects. Both of these majors confer the B.A. degree.

A C average is required for an undergraduate major in either language and literature or area studies.

Language and Literature Major. Courses: SPAN 201, 221, 301-302; 311 or 312, 321-322 or 323-324; 401 or 402 plus five 400 level courses or pro-seminars in literature (one of which may be replaced by a course in civilization, advanced conversation, or applied linguistics), for a total of 39 hours. Nine hours of supporting courses, two of which must be on the 300-400 level in a single area other than Spanish. Suggested areas: government and politics, art, history, philosophy, comparative literature, etc., for a combined total of 48 hours.

Foreign Area Major. The area study major in Spanish endeavors to provide the student with the knowledge of the various aspects of Spain and Spanish America. Specific requirements in this major are SPAN 201, 301-302, 311-312, 321-322 or 323-324, 425-426 or 446-447, and nine credits of Spanish or Spanish American literature in 400 level courses and/or pro-seminars, for a total of 36 hours.

Twelve hours of supporting courses, six of which must be on the 300-400 level in a single area other than Spanish and education. Suggested areas: economics, government and politics, geography, history, philosophy, etc., for a combined total of 48 hours.

Honors in Spanish. A student whose major is Spanish and who, at the time of application, has a general academic average of 3.0 and 3.5 in his major field may apply to the Chairman of the Honors Committee for admission to the Honors Program of the department. Honors work normally begins the first semester of the junior year, but a qualified student may enter as early as the sophomore year or as late as the second semester of the junior year. Honors students are required to take two courses from those numbered 491, 492, 493, and the seminar numbered 496, as well as to meet other requirements for a major in Spanish. There will be a final comprehensive examination covering the honors reading list which must be taken by all graduating seniors who are candidates for honors. Admission of students to the Honors Program, their continuance in the program, and the final award of honors are the prerogative of the Departmental Honors Committee.

Elementary Honors. SPAN 102H is limited to specially approved candidates who have passed SPAN 101 with high grades, and will allow them to enter 104H or 201.

Lower Division Courses. The elementary and intermediate courses in Spanish and Portuguese consist of three semesters of four credits each (101, 102, 104). The language requirement for the B.A. degree in the Division of Arts and Humanities is satisfied by passing 104 or equivalent.

Spanish 101 may be taken for credit by those students who have had two or more years of Spanish in high school, provided they obtain the permission of the Chairman of the Department. Students starting in SPAN 101 must follow the prescribed sequence of SPAN 101, 102, and 104.

Transfer students with college credit have the option of continuing at the next level of study, or of taking a placement examination, or of electing courses 103 and 104. If a transfer student takes course 103 for credit, he retains transfer credit only for the equivalent of course 101. A transfer student placing lower than his training warrants may ignore the placement but DOES SO AT HIS OWN RISK. If he takes 104 for credit, he retains transfer credit for the equivalent of courses 101 and 102.

If a student has received a D in a course, advanced and completed the next higher course, he cannot go back and repeat the original D.

Course Code Prefixes—SPAN PORT

Speech and Dramatic Art

Professor and Chairman: Aylward.
Professors: Meersman, Pugliese, Strausbaugh (Emeritus).
Associate Professors: Kirkley, Linkow, Niemeyer, O'Leary, Vaughan, G. S. Weiss, Wolvin.
Assistant Professors: Bendler, Falcione, Freimuth, Jamieson, Kolker, Lea, Moore, Onder, Starcher, Thompson, Zelenka.
Instructors: Clopton, Cokely, Doyle, Elliott, Howard, Klann, Nagatani, Patterson, Paver, Pearson-Allen, Robinson, Williams, Woodey.
Lecturers: DuMonceau, Hasenauer, McCleary, Niles.

The departmental curricula lead to the Bachelor of Arts degree and permit the student to develop a program with emphasis in one of the three areas of the department: (1) Speech communication (political communication, organizational communication, urban communication, educational communication, and interpersonal communication); (2) Dramatic art (educational theater, acting, directing, producing, theater history, and technical theater); (3) Radio-television-film (broadcasting and film theory, production, history, criticism, and research in a full spectrum program). In cooperation with the Department of Secondary Education, the department provides an opportunity for teacher certification in the speech and drama education program.

The curriculum is designed to provide: (1) a liberal education through special study of the arts and sciences of human communication; (2) preparation for numerous opportunities in business, government, media and related industries, and education.

Since communication is a dynamic field, the course offerings are under constant review and development, and the interested student should obtain specific information about a possible program from a departmental advisor.

The major requirements are: 30 hours of course work in any one of the divisions, exclusive of those courses taken to satisfy University or Divisional requirements. Of the 30 hours, at least 15 must be upper division in the 300 or 400 series. No course with a grade less than C may be used to satisfy major requirements.

Each of the possible concentrations in the department requires certain courses in order to provide a firm foundation for the work in that area.

Speech Communication
Required Courses: SPCH 125, 200, 220, 356, 400 and 474. In addition, 12 semester credit hours in SPCH courses, at least six (6) must be at the 300-400 level.
Supporting Courses: Fifteen credit hours of supporting course work selected in consultation with the major adviser.

Dramatic Art
Required Courses: DART 120, 170, 252, 330, 490, and one of the following: 220, or 420 or 430 and one of the following: 375, or 476 or 480. In addition, five (5) DART courses of which at least two (2) must be at the 300-400 level.
Supporting Courses: Fifteen (15) credit hours from those indicated below:
Dramatic Literature — ENGL 403 or 404 or 405 and either 434 or 454.
Dance — DANC 100 or 110
Music — MUSC 100 or 130 or 208
Art — Any related course offered in the department

Radio-Television-Film
Required Courses: RTVF 222 and 223
Supporting Courses: Fifteen (15) credit hours of coherently related subjects, selected in consultation with an adviser and considering the personal goals of the student.

The department offers numerous specialized opportunities for those interested through co-curricular activities in theater, film, television, radio, readers' theater, debate and forensics. For the superior student an Honors Program is available, and interested students should consult their adviser for further information no later than the beginning of their junior year.

Course Code Prefixes—SPCH, DART, RTVF

Division of Behavioral and Social Sciences

The Division of Behavioral and Social Sciences consists of faculty and students who are involved in research and teaching relating to the analysis and solution of behavioral and social problems. The Division, organized in 1972, contains academic departments which were formerly administered by the College of Arts and Sciences and the College of Business and Public Administration, in addition to a new College of Business and Management. The Division is designed to extend and support learning in the traditional disciplines while creating conditions for the development of interdisciplinary approaches to recurring social problems. Divisional students might choose to concentrate their studies in the traditional fields, or may be interested in focusing on interdisciplinary study. As part of its response to society's need for resolution of the ever more complex problems of modern civilization, the University must promote the utilization of knowledge generated by a cross fertilization of disciplines. The Division will facilitate the grouping and regrouping of faculty across disciplinary lines for problem-oriented research and teaching. The interaction of faculty and students in overlapping fields will be encouraged and supported.

In order to promote the exchange of ideas, education, and knowledge, each unit of the Division, including the College of Business and Management, will be concerned with both applied and theoretical aspects of the resolution of social problems. Practicums and internships will be utilized increasingly for the purpose of relating theoretical and empirical concepts in pursuit of the Division's concern with conditions in society.

The units in the Division are: The College of Business and Management, Department of Afro-American Studies,

Anthropology Department, Department of Economics, Department of Geography, Department of Government and Politics, Department of Information Systems Management, Department of Hearing and Speech Sciences, Department of Sociology, Department of Psychology, Institute of Urban Studies, and the Linguistics Program.

In addition to these departments, programs and institutes, the Division includes the Bureau of Business and Economics Research and the Bureau of Governmental Research.

Entrance Requirements. Requirements for admission to the Division are the same as the requirements for admission to the University.

Degrees. The University confers the following degrees, as appropriate, on students completing programs of study in the academic units in the Division: Bachelor of Arts, Bachelor of Science, Master of Arts, Master of Science, Master of Business Administration, Doctor of Business Administration, Doctor of Philosophy. Each candidate for a degree must file in the Office of Admissions and Registrations, prior to a date announced for each semester, a formal application for the appropriate degree.

Graduation Requirements. A minimum of 120 hours of credit with an average of C, which must include the 30 hours specified by the General University Requirements and the specific major and supporting course requirements of the College of Business and Management or of the programs in the academic units of the Division are required for graduation.

Students who matriculated in departments originally in the College of Business and Public Administration or in departments in the College of Arts and Sciences shall have the option of completing their degrees and requirements as stated under the old college requirements, including the previous General Education Requirements or under the new divisional requirements.

Senior Residence Requirement. All candidates for degrees should plan to take their senior year in residence since the advanced work of the major study normally occurs in the last year of the undergraduate course sequence. At least 24 of the last 30 credits must be done in residence. For example, a student, who at the time of his graduation, will have completed 30 semester hours in residence may be permitted to do no more than 6 semester hours of the final 30 credits of record in another institution, provided the student secures permission in advance from the dean or the Division Provost. University College credit is not considered to be resident credit for purposes of the last 30 hour rule. The student must be enrolled in the division from which he or she plans to graduate when registering for the last 15 credits of his or her program.

Honors: The Provost's List of Distinguished Students. Any student who has passed at least 12 hours of academic work in the preceding semester, without failure of any course, and with an average grade on all courses of at least 3.5 will be placed on the Provost's List of Distinguished Students.

College of Business and Management

Dean: Lamone.
Assistant Deans: Haslem, Edelson.
Director of Graduate Studies: Holmberg.
Director of Undergraduate Studies: Mattingly.
Professors: H. Anderson, Carroll, Dawson, Gannon, Gass, Greer, Lamone, Levine, Locke, Nash, Paine, Roberts, Taff, Wright.
Visiting Professor: Fisher.
Associate Professors: Ashmen, Edelson, Edmister, Fromovitz, Haslem, Hynes, Kuehl, Leete, Loeb, Nickels, Olson, Pfaffenberger, Spivey, Thiebolt, Widhelm.
Assistant Professors: C. Anderson, R. Anderson, Beard, Bedingfield, Bloom, Bowers, Ford, Formisano, Hargrove, Holmberg, Jolson, Kumar, May, McKee, Neuman, Poist, Robeson, Schneier, Solomon, Taylor.
Lecturers: L. Anderson, Baker, Brown, Buckingham, Chaires, Corwin, Dalton, Doyle, Enis, Garbuny, Gillen, Gramling, Grazer, Grimshaw, Harvey, Hicks, Max Levine, Levy, Lindsay, Matthews, McConnell, McGee, Meier, Morash, Morris, Patton, Pearce, Raben, Robinson, Rymer, Schilit, Schuster, Spates, Stewart, Thomas, Zeithaml.
Assistant Instructors: Coarts, Reksten.

The College of Business and Management is the accredited collegiate school of business in the Maryland-Washington, D.C. area. This accreditation by the American Assembly of Collegiate Schools of Business recognizes the quality of programs and faculty in the College. The College recognizes the importance of education in business and management to economic, social, and professional development through profit and nonprofit organizations at the local, regional, and national levels. The faculty of the College have been selected from the leading doctoral programs in business. They are scholars, teachers, and professional leaders with a commitment to superior education in business and management.

The College has faculty specializing in Accounting; Finance; Management Science and Statistics; Marketing; Organizational Behavior and Industrial Relations; and Transportation, Business and Public Policy.

Undergraduate Program. The undergraduate program recognizes the need for professional education in business and management based on a foundation in the liberal arts. Modern society comprises intricate business, economic, social, and governmental institutions requiring a large number of men and women trained to be effective and responsible managers. The College regards its program leading to the Bachelor of Science in business and management as one of the most important ways it serves this need.

A student in business and management selects a concentration in one of several curricula: (1) Accounting; (2) Finance; (3) General Curriculum in Business and Management; (4) Management Science-Statistics; (5) Marketing; (6) Personnel and Labor Relations; (7) Production Management and; (8) Transportation. For students interested in Law as a career there is a combined Business and Law Program.

Students interested in insurance, real estate, institutional management, or international business may plan with their advisor to elect courses to meet their specialized needs.

At least 45 hours of the 120 semester hours of academic work required for graduation must be in business and management subjects. A minimum of 57 hours of the required 120 hours must be in 300 or 400 level courses. In addition to the requirement of an overall average of C in academic subjects, an average of C in business and management subjects is required for graduation. Electives in the curricula of the college may be taken in any department of the University if the student has the necessary prerequisites. Business courses taken as electives may not be taken on a pass/fail basis by students of the College of Business and Management.

Degrees. The University confers the following degrees on students successfully completing programs of study in the College: Bachelor of Science (B.S.); Master of Business Administration (M.B.A.); Doctor of Business Administration (D.B.A.). Each candidate for a degree must file in the Registrar's Office, prior to a date announced for each semester, a formal application for a degree. Information concerning admissions to the M.B.A. and D.B.A. programs is available from the college director of graduate studies.

Academic Advisement. General advisement in the College of Business and Management is available in Room 5119, Tydings Hall. It is recommended that students visit this office each year to ensure they are informed about current requirements and procedures. Specific advisement pertaining to a particular curriculum (for example, accounting) is available from the chairman or other faculty in the particular area of study. Student problems concerning advisement should be directed to the Director of Undergraduate Studies in Room 3136A, Tydings Hall.

Transfer students entering the University can be advised during transfer orientation and first semester freshmen entering the University in the fall can receive advisement during the summer freshmen orientation program of the college.

Entrance Requirements. Requirements for admission to the college are those of the University. To assure a likelihood of success in the college, it is recommended that the student have four units of English, three or *preferably four units* of college preparatory mathematics (including a minimum of two units of algebra and one unit of geometry), one or more units of history and social science, two or more units of natural science, and two or more units of foreign language. Students expecting to enroll in the College of Business and Management should pursue the precollege program in high school.

Statement of Policy on the Transfer of Credit from Community Colleges. The College of Business and Management subscribes to the policy that a student's undergraduate program below the junior year should include no advanced, professional level courses. This policy is based on the conviction that the value derived from these advanced courses is materially enhanced when based upon a sound foundation in the liberal arts.

In adhering to the above policy, it is the practice of the College of Business and Management to accept in transfer from an accredited community college no more than 12 semester hours of work in business administration courses.

The 12 semester hours of business administration acceptable in transfer are specifically identified as three (3) semester hours in an introductory business course, three (3) semester hours in business statistics, and six (6) semester hours of elementary accounting. Thus, it is anticipated that the student transferring from another institution will have devoted the major share of his academic effort, below the junior year, to the completion of basic requirements in the liberal arts. A total of 60 semester hours may be transferred from a community college and applied toward a degree from the College of Business and Management.

Statement of Policy on the Transfer of Credits from Other Institutions. The College of Business and Management normally accepts transfer credits from accredited four-year institutions. Junior- and senior-level business courses are accepted from colleges accredited by the American Assembly of Collegiate Schools of Business (AACSB). Junior- and senior-level business courses from other than AACSB accredited schools are evaluated on a course-by-course basis to determine transferability.

Honor Societies

Beta Alpha Psi. National scholastic and professional honorary fraternity in accounting. Members are elected on the basis of excellence in scholarship and professional service from junior and senior students majoring in Accounting in the College of Business and Management.

Beta Gamma Sigma. National scholastic honorary in business administration. To be eligible students must rank in the upper five percent of their junior class or the upper ten percent of their senior class in the College of Business and Management.

Phi Sigma Phi. National scholastic honorary sponsored by the Propeller Club of the United States. Membership is elected from outstanding senior members of the University of Maryland chapter of the Propeller Club majoring in Transportation in the College of Business and Management.

Student Awards. Dean's List, Delta Sigma Pi Scholarship Key; Distinguished Accounting Student Awards, and Wall Street Journal Student Achievement Award

Scholarships. Alcoa Foundation Traffic Scholarship; Delmarva Traffic Club Scholarship; Delta Nu Alpha Chesapeake Chapter No. 23 Scholarship; Robert Half Personnel Accounting and Tax Awards, Lum's Restaurant Annual Scholarship Award, National Capital Housewares Club Scholarship Aid Fund, Pilot Freight Carriers, Inc. Scholarship; Jack B. Sacks Foundation Scholarship Fund, and Charles A. Taff Scholarship Fund, and Delta Nu Alpha.

Student Professional Organizations. American Marketing Association; Delta Nu Alpha (Transportation); Delta Sigma Pi (business students); Phi Chi Theta (business students); Society for the Advancement of Management; and Propeller Club of America (Transportation).

Freshman and Sophomore Requirements

	Semester Hours
General University Requirements (GUR)	30(31)
MATH 110, 111 and 220 or (140 and 141)*	9(8)
SPCH 100	3
BMGT 110	3
BMGT 220A and 221A (220 and 221)**	6
ECON 201 and 203	6
BMGT 230 (231)*	3
	60

*Required for Management Science-Statistics curriculum and Statistics-IFSM, optional for other curricula.
**Required for Accounting Curriculum

A Typical Program for Freshman and Sophomore Years. Required Courses and Semester Hours in Addition to General University Requirements.

FRESHMAN YEAR	
GUR	9
BMGT 110 or SPCH 100	3
MATH 110 (or 140)	3(4)
First semester total	15-16
GUR	9
SPCH 100 or BMGT 110	3
MATH 111 (or 141)	3(4)
Second semester total	15-16
SOPHOMORE YEAR	
GUR	6-9*
BMGT 220 (220A)	3
ECON 201	3
MATH 220*	3
Third semester total	15

*3 hours GUR substituted for MATH 220 for Management Science-Statistics curriculum and Statistics-IFSM curriculum.

GUR	6
ECON 203	3
BMGT 221 (221A)	3
BMGT 230 (231)	3
Fourth semester total	15

Junior and Senior Requirements

	Semester Hours
(1) The following required courses:	
BMGT 340—Business Finance	3
BMGT 350—Marketing Principles and Organization	3
BMGT 364—Management and Organization Theory	3
BMGT 380—Business Law	3
BMGT 495—Business Policies	3
	15

(2) Curriculum Concentration — see requirements for each	15-24
(3) Economics/social sciences electives — see requirements for each curriculum	3-6
(4) Electives — see each curriculum	15-21
Total	60

Curricula

Accounting. Accounting, in a limited sense, is the analysis, classification and recording of financial events and the reporting of the results of such events for an organization. In a broader sense, accounting consists of all financial devices for planning, controlling and appraising performance of an organization. In this broader sense, accounting includes among its many facets financial planning, budgeting, accounting systems, financial management controls, financial analysis of performance, financial reporting, internal and external auditing, and taxation of business.

The accounting curriculum provides an educational foundation for careers in accounting and a foundation for future advancement in other management areas whether in private business organizations, government agencies, or public accounting firms. Students who select this curriculum will complete the freshman and sophomore requirements for all students in the College of Business and Management.

Course requirements for the junior-senior curriculum concentration in accounting are:

(1) The following required courses:		Semester Hours
IFSM	401—Electronic Data Processing	3
BMGT	310, 311—Intermediate Accounting	6
BMGT	321—Cost Accounting	3
BMGT	323—Income Tax Accounting	3

(2) three of the following courses:

BMGT	320—Accounting Systems
BMGT	420, 421—Undergraduate Accounting Seminar
BMGT	422—Auditing Theory and Practice
BMGT	424—Advanced Accounting
BMGT	425—CPA Problems
BMGT	427—Advanced Auditing Theory and Practice
BMGT	426—Advanced Cost Accounting 9
Total	24

The junior-senior requirements are:

Junior-senior requirements for all college students	15
Junior-senior curriculum concentration (minimum)	24
Electives in 400 level economics courses at least one of which must be ECON 401, 403, 430, or 440	6
Electives to complete 120 semester hours required for graduation (of which 12 semester hours must be in 300 or 400 level courses)	15
Total	60

On or after July 1, 1974, the educational requirement of the Maryland State Board of Accountancy shall be a baccalaureate or higher degree with a major in accounting as defined by the Board, or with a non-accounting major supplemented by what the Board determines to be substantially the equivalent of an accounting major.

An accounting major shall be considered generally as constituting a minimum of (1) 30 semester hours in accounting subjects, which shall include (but shall not be limited to) courses in accounting principles, auditing, cost accounting and federal income tax; (2) 6 semester hours in commercial law; and (3) 4 semester hours in principles of economics.

A student planning to take the CPA examination in a state other than Maryland should determine the course requirements, if any, for that state and arrange his or her program accordingly.

Finance. The finance curriculum is designed to familiarize the student with the institutions, theory and practice involved in the allocation of financial resources within the private sector, especially the firm. It is also designed to incorporate foundation study in such related disciplines as economics and the quantitative areas.

The finance curriculum provides an educational foundation for careers involving financial analysis and management, investment analysis and portfolio management, investment banking, insurance and risk management, banking, and international finance; it also provides a foundation for graduate study in business administration, quantitative areas, economics, and law.

Course requirements for the junior-senior curriculum concentration in finance are:

(1) the following required courses:		Semester Hours
IFSM	401—Electronic Data Processing	3
ECON	430—Money and Banking	3
BMGT	332—Operations Research for Management Decisions	3
BMGT	343—Investments	3

(2) two of the following courses:

BMGT	440—Financial Management
BMGT	443—Security Analysis and Valuation
BMGT	445—Commercial Bank Management
BMGT	481—Public Utilities 6

(3) one of the following courses (check prerequisites):

IFSM	402—Electronic Data Processing Applications
BMGT	430—Linear Statistical Models in Business
BMGT	431—Design of Statistical Experiments in Business
BMGT	433—Statistical Decision Theory in Business
BMGT	434—Operations Research I
MATH	three semester hours of mathematics beyond the college requirement 3
Total	21

The junior-senior requirements are:

Junior-senior requirements for all college students	15
Junior-senior curriculum concentration	21
One course in economics selected from ECON 401, 403, 431, 440, 450, and 402*	3
Electives to complete the 120 semester hours required for graduation (of which 18 hours must be in 300 or 400 level courses)	21
Total	60

*especially recommended

General Curriculum in Business and Management. The general curriculum is designed for those who desire a broader course of study in business and management than offered in the other college curricula. The general curriculum is appropriate, for example, for those who plan to enter small business management or entrepreneurship where general knowledge of the various fields of study may be preferred to a more specialized curriculum concentration.

Course requirements for the junior-senior curriculum concentration in general business and management are:

Accounting/Finance

		Semester Hours
BMGT	321—Cost Accounting	
	or	
BMGT	440—Financial Management	3

Management Science/Statistics

BMGT	332—Operations Research for Management Decisions
	or

BMGT 431—Design of Statistical Experiments in Business
or
BMGT 433—Statistical Decision Theory in Business ... 3

Marketing

BMGT 351—Marketing Management
or
BMGT 450—Marketing Research Methods
or
BMGT 452—Promotion Management ... 3

Personnel/Labor Relations

BMGT 360—Personnel Management
or
BMGT 362—Labor Relations ... 3

Public Policy

BMGT 481—Public Utilities
or
BMGT 482—Business and Government ... 3

Transportation/Production Management

BMGT 370—Principles of Transportation
or
BMGT 372—Traffic and Physical Distribution Management
or
BMGT 385—Production Management ... 3
Total ... 18

The junior-senior requirements are:

Junior-senior requirements for all college students	15
Junior-senior curriculum concentration	18
Electives in 400 level economics, psychology or sociology courses, at least one of which must be ECON 401, 403, 430, or 440	6
Electives to complete 120 semester hours required for graduation (of which 18 semester hours must be in 300 or 400 level courses)	21
Total	60

Management Science-Statistics. In the management science-statistics curriculum, the student has the option of concentrating primarily in statistics or primarily in management science. The two options are described below.

Statistics option. Statistics consists of a body of methods for utilizing probability theory in decision-making processes. Important statistical activities ancillary to the decision-making process are the systematization of quantitative data and the measurement of variability. Some specialized areas within the field of statistics are: sample surveys, forecasting, quality control, design of experiment, Bayesian decision processes, actuarial statistics, and data processing. Statistical methods — for example, sample survey techniques — are widely used in accounting, marketing, industrial management, and government applications. An aptitude for applied mathematics and a desire to understand and apply scientific methods to significant problems are important prerequisites for the statistician.

Students planning to major in statistics must take MATH 140-141.

Course requirements for the junior-senior curriculum concentration in the statistics option are:

(1) the following required courses:	Semester Hours
BMGT 430—Linear Statistical Models in Business	3
BMGT 432—Sample Surveys in Business and Economics	3
BMGT 434—Operations Research I	3
BMGT 438—Topics in Statistical Analysis for Business and Management	3

(2) two of the following courses:

IFSM 401—Electronic Data Processing	
BMGT 433—Statistical Decision Theory in Business	
BMGT 435—Operations Research II	
BMGT 436—Applications of Mathematical Programming in Management Science	
BMGT 450—Marketing Research Methods	
STAT 400—Probability and Statistics I ...	6
Total ...	18

Management Science option. Management Science (operations research) can be defined as the application of scientific methodology by interdisciplinary teams to problems involving the control of organized man-machine systems so as to provide solutions which best serve the purposes of the organization as a whole. Practitioners in this field are employed by large organizations (military, governmental, private industrial, private consulting), to analyze operations in the light of organizational goals and recommended changes requisite to goal fulfillment.

Students planning to major in this field must complete MATH 140-141 prior to junior standing. Students considering graduate work in this field should complete MATH 240-241 as early as possible in their careers.

Course requirements for the junior-senior curriculum concentration in the management science option are:

(1) the following required courses:	Semester Hours
BMGT 430—Linear Statistical Models in Business	3
BMGT 434—Operations Research I	3
BMGT 435—Operations Research II	3
BMGT 436—Applications of Mathematical Programming in Management Science	3

(2) two of the following courses:

BMGT 432—Sample Surveys in Business and Economics	
BMGT 433—Statistical Decision Theory in Business	
BMGT 438—Topics in Statistical Analysis for Business and Management	
STAT 400—Applied Probability and Statistics I	
IFSM 401—Electronic Data Processing	
IFSM 410—Information Processing Problems of Administrative, Economic, and Political Systems	
IFSM 436—Introduction to System Analysis	
BMGT 385—Production Management	
BMGT 485—Advanced Production Management.	6
Total ...	18

The junior-senior requirements for both options are:

Junior-senior requirements for all college students	15
Junior-senior curriculum concentration electives in 400 level economics courses at least one of which must be ECON 401, 403, 430 or 440	6
Electives to complete 120 semester hours required for graduation (of which 18 semester hours must be in 300 or 400 level courses or approved equivalent)	21
Total	60

Marketing. Marketing involves the functions performed in getting goods and services from producers to users. Career opportunities exist in manufacturing, wholesaling and retailing and include sales administration, marketing research, advertising and merchandising.

Students preparing for work in marketing research are advised to elect additional courses in management science and statistics.

Course requirements for the junior-senior curriculum concentration in marketing are:

(1) the following required courses:

		Semester Hours
BMGT	332—Operations Research for Management Decisions	3
BMGT	351—Marketing Management	3
BMGT	352—Advertising	3
BMGT	450—Marketing Research Methods	3

(2) and two of the following courses:

IFSM	401—Electronic Data Processing	
BMGT	353—Retail Management	
BMGT	372—Traffic and Physical Distribution Management	
BMGT	431—Design of Statistical Experiments in Business	
BMGT	453—Industrial Marketing	
BMGT	451—Consumer Analysis	
BMGT	454—International Marketing	
BMGT	455—Sales Management	
BMGT	452—Promotion Management	6
	Total	18

The junior-senior requirements are:

Junior-senior requirements for all college students	15
Junior-senior curriculum concentration	18
Electives in 400 level economics courses at least one of which must be ECON 401, 403, 430, or 440	6
Electives to complete 120 semester hours required for graduation (of which 18 semester hours must be in 300 or 400 level courses)	21
Total	60

Personnel and Labor Relations. Personnel administration has to do with the direction of human effort. It is concerned with securing, maintaining and utilizing an effective working force. People professionally trained in personnel administration find career opportunities in business, in government, in educational institutions, and in charitable and other organizations.

Course requirements for the junior-senior curriculum in personnel and labor relations are:

(1) the following required courses:

		Semester Hours
BMGT	360—Personnel Management	3
BMGT	362—Labor Relations	3
BMGT	460—Personnel Management — Analysis and Problems	3
BMGT	464—Organizational Behavior	3
BMGT	462—Labor Legislation	3

(2) one of the following courses:

BMGT	467—Undergraduate Seminar in Personnel Management	
BMGT	385—Production Management	
PSYC	461—Personnel and Organizational Psychology	
PSYC	451—Principles of Psychological Testing	
PSYC	452—Psychology of Individual Differences	
SOCY	462—Industrial Sociology	
SOCY	447—Small Group Analysis	
GVPT	411—Public Personnel Administration	
JOUR	330—Public Relations	3
	Total	18

The junior-senior requirements are:

Junior-senior requirements for all college students	15
Junior-senior curriculum concentration	18
Electives in 400 level economics courses at least one of which must be ECON 401, 403, 430, or 440	6
Electives to complete 120 semester hours required for graduation (of which 18 semester hours must be in 300 or 400 level courses)	21
Total	60

Production Management. This curriculum is designed to acquaint the student with the problems of organization and control in the field of production management. Theory and practice with reference to organization, policies, methods, processes and techniques are surveyed, analyzed and evaluated.

Course requirements for the junior-senior curriculum concentration in production management are:

(1) the following required courses:

		Semester Hours
BMGT	321—Cost Accounting	3
BMGT	360—Personnel Management	3
BMGT	385—Production Management	3
BMGT	485—Advanced Production Management	3

(2) two of the following courses:

BMGT	433—Statistical Decision Theory in Business	
BMGT	453—Industrial Marketing	
BMGT	362—Labor Relations	
BMGT	332—Operations Research for Management Decisions	
BMGT	372—Traffic and Physical Distribution Management	6
	Total	18

The junior-senior requirements are:

Junior-senior requirements for all college students	15
Junior-senior curriculum concentration	18
Electives in 400 level economics courses at least one of which must be ECON 401, 403, 430, or 440	6
Electives to complete 120 semester hours required for graduation (of which 18 semester hours must be in 300 or 400 level courses)	21
Total	60

Transportation. Transportation involves the movement of persons and goods in the satisfaction of human needs. The curriculum in transportation includes an analysis of the services and management problems, such as pricing, financing, and organization, of the five modes of transport — air, motor, pipelines, railroads, and water — and covers the scope and regulation of transportation in our economy. The effective management of transportation involves a study of the components of physical distribution and the interaction of procurement, the level and control of inventories, warehousing, material handling, transportation, and data processing. The curriculum in transportation is designed to prepare students to assume responsible positions and carriers, governmental agencies, and traffic and physical distribution management in industry.

Course requirements for the junior-senior curriculum concentration in transportation are:

(1) the following required courses:

		Semester Hours
BMGT	332—Operations Research for Management Decisions	3
BMGT	370—Principles of Transportation	3
BMGT	372—Traffic and Physical Distribution Management	3
BMGT	470—Land Transportation Systems	
	or	
BMGT	471—Air and Water Transportation Systems	3
BMGT	473—Advanced Transportation Problems	3

(2) one of the following courses:

BMGT	385—Production Management	
IFSM	401—Electronic Data Processing	
BMGT	470—Land Transportation Systems	
	or	
BMGT	471—Air and Water Transportation Systems (depending on choice under (1) above)	
BMGT	474—Urban Transportation & Development	
BMGT	475—Advanced Logistics Management	
BMGT	481—Public Utilities	

BMGT 482—Business and Government	3
Total	18

The junior-senior requirements are:

Junior-senior requirements for all college students	15
Junior-senior curriculum concentration	18
Electives in 400 level economics courses at least one of which must be ECON 401, 403, 430, or 440	6
Electives to complete 120 semester hours required for graduation (of which 18 semester hours must be in 300 or 400 level courses)	21
Total	60

Combined Business and Law Program. The College of Business and Management offers a combined Business Law Curriculum in which the student completes three years in the chosen curriculum concentration in the college and a fourth year of work in the Law School of the University of Maryland. Admission to the law school is contingent upon meeting the applicable standards of that school. Individual students are responsible to secure from the law school its current admission requirements. The student must complete all the courses required of students in the college, except BMGT 380 and BMGT 495. In addition, they must complete all courses normally required for one of the specific curriculum concentrations in business and management and enough other credits to equal a minimum of 90 semester hours. No business law course can be included in the 90 hours. The last year of college work before entering the law school must be completed in residence at College Park. At least 30 hours of work must be in courses numbered 300 or above.

The Bachelor of Science degree is conferred by the college upon students who complete the first year in the law school with an average grade of C or better

Insurance and Real Estate. Students interested in insurance or real estate may wish to concentrate in finance or general business and management and plan with their advisors a group of electives to meet their specialized needs. College courses offered in insurance are:

BMGT 390—Risk Management
and
BMGT 391—Principles of Risk and Insurance

College courses offered in real estate are:
BMGT 393—Real Estate Principles
BMGT 490—Urban Land Management

Institutional Management. Students interested in hotel-motel management or hospital administration may wish to concentrate in general business and management, finance, or personnel and labor relations and plan with their advisors a group of electives to meet their specialized needs.

International Business. Students interested in international business may wish to concentrate in marketing or general business and management and plan with their advisors a group of electives to meet their specialized needs.

Afro-American Studies Program

Assistant Professor and Acting Director: Nzuwah.
Assistant Professors: Landry, Williams, Yimenu.
Lecturers: Harris, Mayfield, McDonald, Mobley, Ndissi, Serapaio and Smyley.

The Afro-American Studies Program offers a Bachelor of Arts or a Bachelor of Science degree to students who declare a major in Afro-American Studies and who fulfill the academic requirements of this degree program.

Students who want to take a major in another department, as well as follow a concentration outside his major of 18 hours of upper division course work with an emphasis on black life and experiences, can receive a Certificate in Afro-American Studies. This work includes courses in art, African languages, economics, English, geography, history, music, political science, sociology, speech and education.

Undergraduates in good standing may enroll in the program by contacting Professor Mariiyo Nzuwah, Professor Roosevelt Williams, Professor Bartholomew Landry or Rosetta Thompson of the Afro-American Studies Program, in Room 0100, Woods Hall. Students pursuing a major or certificate must meet the General University and division requirements.

Students who plan to major in Afro-American Studies must complete a total of 36 hours of Afro-American Studies courses. At least 24 of the 36 hours must be in upper division courses (300-400 numbers). Twelve hours of basic courses are required. To fulfill this requirement, all majors must take the twelve hours of basic courses: AASP 100, AASP 200, AASP 202 and AASP 298A. A minimum of six hours of seminars (two courses) are required: AASP 401 to be taken after completing 15 hours of required courses, and AASP 397 to be taken during the student's senior year. AASP 397 will include the writing of a senior thesis. The remaining 18 hours of upper division course work (300-400 numbers) should be concentrated in areas of specialization within the Program, but may not include AASP 397 or AASP 401. Related and supporting courses taken in other departments must be approved by a faculty advisor on the student's program plan. Each course counted for the above requirements must be passed with a grade of C or better. In addition to the program of courses indicated above, each student majoring in Afro-American Studies is strongly advised to utilize the remainder of the 120 hours required for graduation by concentrating his studies in areas such as African Studies, Technology, Fine Arts, Pre-Law, Pre-Medicine, Business Administration, Social Sciences, and Urban Studies, etc. Model four-year program for these and other areas of concentration are available from program advisors.

To receive a Certificate in Afro-American Studies, the student must enroll and receive a satisfactory grade in AASP 100 plus at least three (3) of the required courses which must include AASP 401, Seminar in Afro-American Studies. In addition, the student may also choose a number of approved courses from a list of recommended electives to meet the minimum requirements of 18 credit hours.

Behavioral and Social Sciences Departments, Programs and Curricula

Anthropology

Professor and Chairman: Kerley.
Professor: Williams.
Associate Professors: Anderson, Hoffman, Leone, Rosen.
Assistant Professors: Benjamin, Dessaint, Hourihan, Migliazza, Schacht, Stuart.
Lecturers: Handsman, Ojikutu.

The Anthropology Department offers beginning and advanced course work in the four principal subdivisions of the discipline: physical anthropology, linguistics, archaeology and ethnology. Courses in these subdivisions may be used to fulfill the minor or "supporting courses" requirement in some programs leading to the B.A. degree. They also may, at the discretion of the Department of Sociology, be counted toward a major in Sociology.

Anthropology Major: The fulfillment of the requirements for a major in anthropology leads to the B.A. degree. All majors are required to take 30 hours in anthropology, 18 of which must be selected from the following courses: ANTH 101, 102, 401, 441, or 451, 371 or 461, and 397. It should be noted, however, that if ANTH 101 is used to satisfy the General University requirement in Behavioral and Social Sciences, it may

not be counted as a part of the 30 required semester hours for the major. The 18 hours of required courses insures that the major becomes familiar with all areas of anthropology. No one area therefore, receives special emphasis, for it is believed that such specialization should occur during graduate study, preferably at the Ph.D. level. Thus the student is broadly prepared in the ways humans have evolved culturally and physically. A statement of course requirements and recommended sequences of courses is available in the departmental office.

No course with a grade of less than C may be used to satisfy major requirements.

ANTH 101, ANTH 102, or their equivalent, or permission of the instructor, is prerequisite to all other courses in Anthropology.

Course Coda Prefix—ANTH

Business and Economic Research

Professor and Acting Director: Cumberland.
Professors: Cumberland, Harris.
Associate Professor: Fisher.
Assistant Professors: Clotfelter, King.

The functions of the Bureau of Business and Economic Research are research, education and public service.

The research activities of the bureau are primarily focused on basic research in the field of regional, urban and environmental studies. Although the bureau's long-run research program is carried out largely by its own staff, faculty members from other departments also participate. The bureau also undertakes cooperative research programs with the sponsorship of federal and state governmental agencies, research foundations and other groups.

The educational functions of the bureau are achieved through active participation by advanced graduate and undergraduate students in the bureau's research program. This direct involvement of students in the research process under faculty supervision assists students in their degree programs and provides research skills that equip students for responsible posts in business, government and higher education.

The bureau observes its service responsibilities to government, business, and private groups primarily through the publication and distribution of its research findings. In addition, the bureau staff welcomes the opportunity to be of service to governmental and civic groups by consulting with them on problems, especially in the fields of regional and urban economic development and forecasting, state and local public finance, and environmental management.

Criminal Justice and Criminology

Professor and Director: Lejins.
Criminology Program:
Part-time Visiting Professor: Toland.
Associate Professors: Maida, Tennyson.
Visiting Associate Professor: Wheeler.
Part-time Visiting Associate Professor: Viano.
Lecturers: Block, Lee.
Part-time Lecturers: Dudley, Freivalds.
Law Enforcement Curriculum:
Assistant Professors: Ingraham, Johnson.
Visiting Assistant Professor: Jamison.
Part-time Lecturers: Banta, Larkins, Rogers, Verchot, Wolman.
Part-time Instructor: Marvil.

The purpose of the Institute is to provide an organizational and administrative basis for the interests and activities of the University, its faculty and students in the areas usually designated as law enforcement, criminology and corrections. The Institute is to promote study and teaching concerning the problems of crime and delinquency by offering and coordinating academic programs in the area of law enforcement, criminology and corrections; managing research in these areas; and conducting demonstration projects.

The Institute comprises as its component parts:

1. The Criminology Program.
2. The Law Enforcement Curriculum.
3. The program leading to a Bachelor of Arts in General Studies with specializations in law enforcement and corrections offered by the University College.
4. Other appropriate divisions to be developed for the areas of research and demonstration projects.

The major in criminology comprises 30 hours of course work: 18 hours in Criminology, 6 hours in Law Enforcement and 6 hours in Sociology. Eighteen hours in social or behavioral science disciplines are required as a supporting sequence. In these supporting courses a social or behavioral science statistics, and a social or behavioral science methods course are required. Psychology 331 or 431 is also required. In addition, two Psychology elective courses and a general social psychology course are required. Regarding the specific courses to be taken, the student is required to consult with an advisor. No grade lower than C may be used toward the major.

Major

		Hours			Hours
CRIM	220	3	CRIM	454	3
CRIM	450	3	LENF	100	3
CRIM	451	3	LENF	230	3
CRIM	452	3	SOCY	433	3
CRIM	453	3	SOCY	427	3
					30

Supporting

PSYC 331 or 431	3
Social Psych — such as PSYC 221, SOCY 230, SOCY 430 or SOCY 447	3
PSYC electives	6
Soc. Sci. statistics	3
Soc. Sci. methods	3
	18

General University Requirements	30
Electives	42
	120

Economics

Acting Chairman: Gruchy.
Professors: Aaron, Adelman, Almon, Bailey, Bergmann, Cumberland, Dillard, Gruchy, Harris, Kelejian, McGuire, O'Connell, Olson, Schultze, Straszheim, Ulmer, Wonnacott.
Associate Professors: Adams, Bennett, Betancourt, Clague, Dodge, Dorsey, Fisher, Knight, McLoone* (Education), Meyer, Singer, Weinstein.
Assistant Professors: Brown, Clotfelter, Johnson* (Applied Math), King, Lieberman, MacRae, Morton, Peterson, Snower, Vavrichek, Vroman, Weiss, West.
Lecturers: Dardis* (Home Economics), Fleisig, Measday, Tsien.
Instructors: Bausell, Chase, Crary, Gallagher, Gianfrancesco, Grieves, Hahnel, McCarthy, Oelhaf, Snyder.
*Joint appointment with indicated department.

The study of economics is designed to give students an understanding of the American economic system and our country's economic relations with the rest of the world, and the ability to analyze the economic forces which largely determine the national output of goods and services, the level of prices, and the distribution of income. It is also designed to prepare students for graduate study, and for employment opportunities in private business, the Federal government, state and local government, universities and research institutions. Demand for college graduates trained in economics continues to be strong, and this is among the fields of undergraduate study strongly recommended for students planning to study law, or enter public administration, as well as those who plan to become professional economists.

Requirements for the Economics Major. In addition to the thirty-hour General University Requirements, the requirements for the Economics major are:

(1) *Mathematics.*

Six credit hours. No specific courses are required, but the combination of MATH 110 (Introduction to Mathematics) and MATH 220 (Elementary Calculus) is highly recommended for those who take only six hours. Students planning to do graduate study in economics are strongly urged to take more than the minimum six-hour mathematics requirement, since graduate programs emphasize the application of mathematical and statistical techniques in the analysis of economic problems.

Economics majors should take mathematics courses early in their college careers in order to gain an understanding of mathematical principles which will assist them in later course work in Economics.

(2) *Upper Division Courses Outside of Economics.*

Twelve credit hours. Economics majors must earn credit for twelve hours of upper division work in non-economics courses (in addition to the nine hours of upper division courses required as part of the General University Requirements). For purposes of this requirement, any of the following may count as an "upper division" course: any course numbered 300 or above; any course in mathematics beyond the six hours required of all economics majors; and any course in a department for which the prerequisites are the equivalent of one year of college-level work in that department. In particular, a second-year college course in foreign languages may be counted as "upper division."

(3) *Economics Courses.*

Thirty-six credit hours. Economics majors must earn 36 credit hours in economics. Courses required of all majors are: ECON 201, 203, 310 (formerly 110), 401, 403, and 421.

In lieu of Economics 421 (Economic Statistics), the student may take one of the following statistics courses: BMGT 230, BMGT 231, or STAT 400. A student who takes ECON 205 before deciding to major in Economics may continue with ECON 203, without being required to take ECON 201.

The remainder of the 36 hours may be chosen from among any other economics courses and from the following courses in Business Administration: BMGT 230, 231, 431, 432, 481. (However, students who take ECON 421 may not also receive credit for BMGT 230 or BMGT 231, and students may not receive credit for ECON 105 if they have taken any two courses from among ECON 201, 203, and 205.)

Students must earn an average grade of not less than C in lower-division economics courses in order to be accepted as economics majors. To graduate as majors, they must pass the minimum of 36 hours in economics. The average grade in all economics courses must be not less than C.

Sequence of Courses. The Department of Economics does not specify a rigid sequence in which courses are to be taken, but it urges its majors to observe the following recommendations.

By the end of the sophomore year, the economics major should have at least completed 6 hours of mathematics, ECON 201 and 203. ECON 201 should be taken before ECON 203. Upon completion of ECON 203, the student should promptly take ECON 401, 403, or both, in the following semester, since these are intermediate theory courses of general applicability in later course work. Majors should take ECON 421 (or equivalent) at an early stage, since an understanding of statistical techniques will be helpful in other courses. (ECON 421 may be completed before other 400-level economics courses, since its only prerequisite is MATH 110 or equivalent.)

Economics majors should take ECON 401 prior to taking ECON 430 or 440, and ECON 403 prior to taking ECON 450, 454, 460, or 470.

Those students planning to pursue graduate study in economics should try to include ECON 422 (Quantitative Methods) and ECON 425 (Mathematical Economics) in their programs and should also consider entering the Departmental Honors Program, if qualified.

Each economics major may select, or be assigned, a faculty member as an advisor, and is encouraged to consult the advisor for course recommendations and other information. Economics majors are welcome, and should feel completely free, to seek advice at any time from any other faculty member in the Department.

Economics Honors Program. The Departmental Honors Program is a three-semester (9 credit hour) program which students enter at the beginning of their last three semesters at the University. It emphasizes seminar discussions of selected topics in economics and independent research and writing, with faculty supervision. The program culminates in the student's presentation of an honors thesis, in the final semester. To be eligible for the Honors Program, a student must have a cumulative grade point average of not less than 3.0.

Geography

Professor and Chairman: Harper.
Professors: Deshler, Fonaroff, Hu.
Associate Professors: Brodsky, Chaves, Groves, Mitchell, Thompson, Wiedel.
Assistant Professors: Christian, Cirrincione, Garst, Muller, Roswell, Thorn, Yoshioka.
Lecturer: Nicholas.

Geography studies the spatial patterns and interactions of natural, cultural, and socio-economic phenomena on earth's surface. The field thus embraces aspects of both the physical and the social sciences, which are applied in the analysis of patterns of distribution of individual phenomena, to the study of complex interrelations of phenomena found in a given region, and to the synthesis of geographic regions. A geographer should, therefore, acquire background knowledge in certain aspects of the physical as well as the social sciences.

Field work and map analysis have been the basic tools of research for the geographer. In recent years these have been augmented by the use of techniques of air photo interpretation and presently by the development of methods of interpreting data obtained from the remote sensing devices of space satellites. Modern geography also is making increasing application of quantitative methods, including the use of statistics and systems analysis, so that mathematical training is becoming increasingly important for a successful career in geography.

Today geographers are employed in a wide range of positions. Geographers in the federal government work in the Departments of State, Interior, Defense, Agriculture, Housing and Urban Affairs, and Health, Education, and Welfare. They are on the staffs of the legislative research branch, the Library of Congress and the National Archives. At the state and local government level there is an increasing demand for geographers in planning positions. And in recent years more and more geographers have found employment in private industry working on problems of industrial and commercial location and market analysis. Teaching at all levels from elementary school through graduate work continues to employ more geographers each year. Some have found geography to be an excellent background for careers in the military, journalism and general business; others have simply found the broad perspective of geography an excellent base for a general education. Most professional positions in geography require graduate training.

Requirements for an Undergraduate Major. Within any of the general major programs it is possible for the student to adjust his program to fit his particular

individual interests. The major totals 33 semester hours.

The required courses of the geography major are:

	Semester Hours
1. Geography Core (GEOG 201, 202, 203, 300)	12
2. Field Study (Selected from GEOG 380, 381, 382, 383, 384)	3
3. A regional course	3
4 Elective systematic and technique courses	15
Total	33

The Geography Core — The following four courses form the minimum essential base upon which advanced work in geography can be built:

GEOG	201—Introduction to Physical Geography.	3
GEOG	202—Introduction to Cultural Geography.	3
GEOG	203—Introduction to Economic Geography	3
GEOG	300—Introduction to Research & Writing.	3

The three lower division courses are to be completed prior to GEOG 300 and all other upper division courses. GEOG 201, 202, and 203 may be taken in any order and a student may register for more than one in any semester. GEOG 300 is specifically designed as a preparation to upper division work and should be taken by the end of the junior year. Upon consultation with a department advisor, a reasonable load of other upper division work in geography may be taken concurrently with GEOG 300.

The Field Study Requirement – The field study requirement may be completed in either of two ways, depending on which is available in the schedule: (1) by taking Geography 380 — Local Field Course, 3 hours or (2) by taking *three out of four* of the following one-hour field study courses each stressing a different aspect of geographic field work: GEOG 381 — Field Study: Physical; GEOG 382 — Field Study: Rural; GEOG 382 — Field Study: Urban; GEOG 384 — Field Study: Methods. Normally two of the different one-hour courses will be offered each semester, and the student should arrange to take them as is convenient during the junior and senior years.

Introduction to Geography — Geography 100: Introduction to Geography is a general education course for persons who have had no previous contact with the discipline in high school or for persons planning to take only one course in geography. It provides a general overview of the field rather than of a single specialized subdivision. Credit for this course is not applied to the major.

Areas of Specialization. Although the major program is flexible and can be designed to fit any individual student's own interest, several specializations attract numbers of students. They are:

Urban Geography and Regional Development – Provides preparation for careers in planning and teaching. Majors electing this specialty take departmental courses in urban geography, industrial location, transportation, and economic geography among others and supporting courses in urban sociology, urban economics, urban transportation, and the urban studies program outside the department.

Physical Geography – For students with special interest in the natural environment and in its interaction with the works of man. This specialization consists of departmental courses in geomorphology, climatology, and resources, and of supporting courses in geology, soils, meteorology, hydrology, and botany.

Cartography – Prepares students for careers in map design, compilation and reproduction. The department offers various courses in thematic mapping, cartographic history and theory, map evaluation, and map and photo interpretation. For additional training students are advised to take supporting courses in art and civil engineering.

Cultural Geography – Of interest to students particularly concerned with the geographic aspects of population, politics, and other social and cultural phenomena, and with historical geography. In addition to departmental course offerings this specialization depends on work in sociology, anthropology, government and politics, history, and economics.

For further information on any of these areas of interest the student should contact a departmental advisor.

All math programs should be approved by a departmental advisor.

Suggested Study Program for Geography

		Hours
Freshman and Sophomore Years		
GEOG	100—Introduction to Geography (Does not count toward geography major)	3
GEOG	201—Introductory Physical Geography	3
GEOG	202—Introductory Cultural Geography	3
GEOG	203—Introductory Economic Geography	3
General University Requirements and/or electives		48
		60
Junior Year		
GEOG	300—Introduction to Research and Writing in Geography	3
GEOG	—A regional geography course	3
GEOG	—Field courses	3
GEOG	—Elective	3
General University Requirements and/or electives		18
		30
Senior Year		
GEOG—Courses to complete major		12
Electives		18
		30
Total		120

Geography Minor and Secondary Education Geography Specialization

College of Education Majors. Secondary Education majors with a concentration in geography are required to take 27 hours in the content field. Geography 201, 202, 203, 490 and a field course are required. The remaining 15 hours of the program consist of 3 hours of regional geography and 12 hours of upper-division systematic courses. For majors in Elementary Education and others needing a geography course for teaching certification, Geography 100 is the required course.

Geography minors should take at least GEOG 201, 202 and 203 in the Geography core and 300 is recommended. As with the major, these courses should be taken before any others.

Course Code Prefix—GEOG

Governmental Research

Associate Professor: Stone.
Research Associate: Feldbaum.
Lecturers: Azzaretto, Behre, Eppes, Kelleher, Moore, Thompson.

Activities of the Bureau of Governmental Research relate primarily to the problems of state and local government in Maryland. The bureau engages in research and publishes findings with reference to local, state and national governments and their interrelationships. It undertakes surveys and offers its assistance and service to units of government in Maryland and serves as a clearinghouse of information for them. The bureau furnishes opportunities for qualified students interested in research and career development in state and local administration. The Bureau also acts as Coordinator for the Annual School for Maryland Assessing Officers.

Urban affairs have become a central focus with the establishment of an Urban Research Group, which draws on a variety of interdisciplinary faculty interests within the University.

The Maryland Technical Advisory Service, a division of the bureau, provides consulting services to county and municipal governments of the state. Technical consultation and assistance are provided on specific problems in such areas as preparation of charters and codes or ordinances, fiscal management, personnel management, utility and other service operations, planning and zoning, and related local or intergovernmental activities. The staff analyzes and shares with governmental officials information concerning professional developments and opportunities for new or improved programs and facilities.

Government and Politics

Professor and Department Chairman: Bobrow.
Professors: Anderson, Dillon, Harrison, Hathorn, Hsueh, Jacobs, McNelly, Murphy, Phillips, Piper, Plischke, Young.
Associate Professors: Claude, Conway, Devine, Elkin, Glass, Glendening, Heisler, Koury, Pirages, Ranald, Reeves, Stone, Terchek, Wilkenfeld.
Assistant Professors: Andriole, Butterworth, Carroll, Christensen, Goodin, Lanning, McCarrick, Oliver, Peroff, Postbrief, Strouse, Uslaner, Werbos, Woolpert.
Lecturers: Barber, Chan, Feldbaum, Kringen, Kupperman, Schneider, Walker.

The Department of Government and Politics offers programs designed to prepare students for government service, politics, foreign assignments, teaching, a variety of graduate programs, and for intelligent and purposeful citizenship.

Course Code Prefix—GVPT

Requirements for the Government and Politics Major. Government and Politics majors must take a minimum of 36 semester hours in government courses and may not count more than 42 hours in government toward graduation. No course in which the grade is less than C may be counted as part of the major. No courses may be taken on a pass-fail basis.

The government and politics fields are as follows: (1) American government and politics; (2) comparative government; (3) international affairs; (4) political theory; (5) public administration; (6) public law; and (7) public policy and political behavior.

All government majors are required to take GVPT 100, 170, 220, 441 or 442 and such other supporting courses as specified by the department. They must take one course from three separate government fields as designated by the department.

All departmental majors shall take ECON 205 or ECON 201. In addition, the major will select courses from one of the following options: (a) methodology, (b) foreign language, (c) philosophy and history of science, or (d) pre-law. A list of courses which will satisfy each option is available in the departmental office. In addition, all majors shall take one course in which the student will be introduced on a systematic basis to the literature that deals with American race relations. A list of approved courses is available in the departmental office.

All students majoring in government must fulfill the requirements of a secondary area of concentration, which involves the completion of 15 semester hours from approved departments other than GVPT. At least six of the 15 hours must be taken at the 300-400 level from a single department.

Students who major in government may apply for admission to the GVPT Honors Program during the second semester of their sophomore year. Additional information concerning the Honors Program may be obtained at the departmental offices.

Departmental majors who have completed at least 75 hours towards a degree and at least 15 hours in GVPT are eligible to participate in the department's Academic Internship Program.

Hearing and Speech Sciences

Professor and Chairman: Newby.
Research Professor: Causey.
Associate Professors: Baker, Bankson, Hamlet*
Assistant Professors: Bernthal, Boss, Cicci**, Doudna, Kumin, Suter**, Weiner.
Research Assistant Professor: Elkins.
Research Associates: Punch, Schweitzer.
Instructors: Beck, Braunstein, Serota, Smit.
Assistant Instructors: Rickerson, Sonies.
Lecturer: Sedge.

*Joint with School of Dentistry
**Joint with School of Medicine.

The departmental curriculum leads to the Bachelor of Arts degree and prepares the student to undertake graduate work in the fields of speech pathology, audiology, and speech and hearing science. In other words, the undergraduate program in this department is a preprofessional one. The student who wishes to work professionally as a speech pathologist or audiologist must complete at least 30 semester hours of graduate course work in order to meet state and national certification requirements.

A student majoring in Hearing and Speech Sciences must complete 21 semester hours of specified courses, and 9 semester hours of electives in the department to satisfy major course requirements. No course with a grade less than C may count toward major course requirements. In addition to the 30 semester hours needed for a major, 18 semester hours of supporting courses in allied fields are required.

Major Courses. Specified courses for a major in Hearing and Speech Sciences are PHYS 102, HESP 202, 302, 305, 400, 403, 411, and nine credits chosen from among HESP 310, 312, 404, 406, 408, 410, 412, 414, and 499.

Supporting Courses. The undergraduate student with a major in Hearing and Speech Sciences will take a total of six courses, 18 credits, as designated in these supporting areas of study:

Required — one of the following courses in statistics.

EDMS	451—Introduction to Educational Statistics	3
PSYC	200—Statistical Methods in Psychology	3
SOCY	201—Introductory Statistics for Sociology	3

The student will select 4 courses, 12 credits, in addition to Psychology 100, from offerings in the Department of Psychology. The following are some suggested courses:

PSYC	206—Developmental Psychology	3
PSYC	221—Social Psychology	3
PSYC	301—Biological Basis of Behavior	3
PSYC	331—Introduction to Abnormal Psychology*	3
PSYC	333—Child Psychology*	3
PSYC	335—Personality and Adjustment	3
PSYC	400—Experimental Psychology: Learning Motivation	4
PSYC	410—Experimental Psychology: Sensory Processes I	4
PSYC	422—Language and Social Communication	3
PSYC	423—Advanced Social Psychology	3
PSYC	431—Abnormal Psychology*	3
PSYC	433—Advanced Topics in Child Psychology	3
PSYC	435—Personality	3

*Strongly recommended

The student will select one additional 3 credit course. The following are suggestions.

HLTH	450—Health Problems of Children and Youth	3
EDCP	413—Behavior Modification	3
EDHD	411—Child Growth and Development	3

EDHD	413—Adolescent Development	3
EDHD	445—Guidance of Young Children	3
EDSP	470—Introduction to Special Education (Non Majors Section)	3
EDSP	471—Characteristics of Exceptional Children — Mentally Retarded	3
EDSP	475—Education of the Slow Learner	3
EDSP	491—Characteristics of Exceptional Children — Perceptual Learning	3
LING	100—Introduction to Linguistics	3
LING	101—Language and Culture	3

A course of the student's choosing may be substituted with the approval of an advisor.

Course Code Prefix—HESP

Information Systems Management

Professor and Acting Chairman: Sibley.
Associate Professor: Courtright.
Assistant Professors: Hardgrave, Sayani, Testa.
Instructors: Chappell, Deutsch.
Lecturer: Lemmer.

The program of studies in information systems management is designed to meet the needs of those wishing to concentrate on the application of the digital computer to the analysis, design and administration of information systems. Students who expect to enter business administration, public administration or organizations in other fields will find that this program offers a relevant preparation.

The student entering this program will place emphasis on the study of digital computer applications, relevant organizational and social implications, and mathematical methods. With the aid of a faculty advisor, the student may wish to develop a secondary field of interest such as business and management administration, computer science, economics, mathematics, psychology, public administration, the social sciences, or related areas of his choice.

Information Systems Management Curriculum. For students enrolled under General University Requirements.

		Semester I	Semester II
Freshman Year			
MATH	140, 141—Analysis I and II	4	4
General University Requirements		9	9
Electives		3	3
Total		16	16

		Semester I	Semester II
Sophomore Year			
BMGT	220, 221—Principles of Accounting	3	3
ECON	201, 203—Principles of Economics	3	3
MATH	240—Linear Algebra	4	
CMSC	103 or 110—Introductory Algorithmic Methods or Elementary Algorithmic Analysis		3
BMGT	231—Business Statistics I		3
General University Requirements		3	
Electives		3	3
Total		16	15

		Semester I	Semester II
Junior Year			
IFSM	401—Electronic Data Processing	3	
IFSM	402—Electronic Data Processing Applications		3
BMGT	434—Operations Research I	3	
BMGT	435—Operations Research II		3
BMGT	430—Linear Statistical Models in Business	3	
ECON	401, 403, 430, or 440 (any two)	3	3
General University Requirements		3	6
Total		15	15

		Semester I	Semester II
Senior Year			
IFSM	410—Information Processing Problems of Models of Administrative, Economic, and Political Systems	3	
IFSM	436—Introduction to Systems Analysis		3
IFSM	420—Information Processing and Computational Problems in Operations Analysis		3
BMGT	438—Topics in Statistical Analysis for Business and Management	3	
Electives		9	6
Total		15	12

Course Code Prefix—IFSM

Linguistics Program

Associate Professor and Director: Dingwall.
Assistant Professor: Fidelholtz.

The program in linguistics is designed to provide students with a comprehensive and consistent view of the accomplishments, methodology and problems of modern linguistic science which has as its aim the explication of the facts of specific natural languages as well as of natural language in general. While any educated man will benefit from an understanding of the structure and development of language, those who expect to become scholars and teachers of anthropology, English, foreign languages, philosophy, psychology, or speech will find a background in linguistics invaluable. Although there is not an undergraduate major in linguistics at this time, courses in linguistics may be used to fulfill the supporting course requirements in some programs leading to the B.A. or B.S. degree.

Course Code Prefix—LING

Psychology

Chairman: Bartlett.
Professors: Anderson, Crites, Fretz, Goldstein, Gollub, Hodos, Horton, Levinson, Martin, McIntire, Mills, Scholnick, Steinman, Taylor, Tyler, Waldrop.
Associate Professors: Barrett, Brown, Dachler, Dies, Larkin, Schneider, Sigall, Smith, Sternheim, Ward.
Assistant Professors: Barbarin, Bobko, Brauth, Coursey, Davis, Gatz, Hill, Johnson, Meltzer, Norman, Riskind, Specter, Steele.
Joint Appointment: Locke, Prof., College of Business and Management.
Affiliated Faculty: Freeman, Assoc. Prof., Coun. Cntr., Gelso, Assoc. Prof., Coun. Cntr., Magoon, Prof., Coun. Cntr., Mills, Prof., Coun. Cntr., Pumroy, Prof., Coll. Educ., Tanney, Asst. Prof., Coun. Cntr.

Psychology can be classified as a biological science (Bachelor of Science degree) and a social science (Bachelor of Arts degree) and offers academic programs related to both of these fields. The undergraduate curriculum in psychology provides an organized study of the behavior of man and other organisms in terms of the biological conditions and social factors which influence such behavior. In addition, the undergraduate program is arranged to provide opportunities for learning that will equip qualified students to pursue further study of psychology and related fields in graduate and professional schools.

Students who are interested in the biological aspects of behavior tend to choose a program leading to the Bachelor of Science degree, while those interested primarily in the social factors of behavior tend to choose the Bachelor of Arts degree. The choice of program is made in consultation with, and requires the approval of, an academic advisor.

Department requirements are the same for the Bachelor of Science and the Bachelor of Arts degrees. A minimum of 31 hours of psychology course work is required: courses taken must include PSYC 100, 200, and eight additional courses. In order to assure breadth these additional courses must be selected from four different areas (two from each area).

The areas and courses are as follows:

Area I	Area II	Area III	Area IV
206	221	331	361
301		333	451
310	420	335	452
400	422	431	461
402	423	433	462
403	440	435	467
410	441		
412	Honors 430C		
453			

At least one course of these eight must be either PSYC 400, 410, or 420. All majors are also required to take MATH 111 or 140, or 220 and at least one laboratory science course outside of Psychology. *One additional, more advanced math or science course (selected from the list appearing in the Departmental Program Guide) must also be taken.

*Approved courses include

ZOOL	201 or higher, except ZOOL 207S, 270 and 280
MATH	141 or higher, except 210, 211, and 220
CHEM	201 or higher, except 302
PHYS	141 or higher, except 181, 221, 222, 400 and 401
MICB	200 or higher
CMSC	210 or higher

These math and science courses may be used as part of the General University Requirements or for the supporting course requirements described below, but not for both. Majors in psychology are urged to take their mathematics and science courses in their first two years.

The supporting courses to supplement the work in the major for the Bachelor of Science degree must include 18 hours in mathematics and science, beyond those courses required by the college. A minimum of two courses must be laboratory courses, and at least three courses (or 9 hours) must be chosen at the advanced level (as described above). The particular laboratory and advanced courses must be approved by an academic advisor in the Department of Psychology.

The supporting courses for the Bachelor of Arts degree must include 18 hours which are chosen in related fields to supplement work in the major. Of these 18 hours, six must be chosen at the 300 and 400 level. This set of courses must be approved by an academic advisor in psychology.

Although a minimum of thirty-one (31) hours of psychology course work is required for a Psychology major, each and every Psychology course taken by the major student must be counted as hours towards the Psychology major. The student majoring in Psychology cannot use any Psychology course towards the University or Divisional course requirements.

A grade of C or better must be earned in the 31 credits of Psychology courses counted towards the major or a course must be repeated until a C or better is earned. If the course is not repeated then another Psychology course fulfilling the same major requirements would have to be substituted. The departmental grade point average will be a cumulative computation of *all* grades earned in Psychology and must be a 2.0 or above.

Students desiring to enter graduate study in certain areas of psychology are advised to take an additional laboratory course and/or participate in individual research projects. Such students should consult an advisor for information about prerequisites for graduate study in psychology.

It should be noted that there are three course content areas that have two courses, one in the 300 sequence and one in the 400 sequence. These include abnormal (331 and 431), personality (335 and 435), child psychology (333 and 433), and industrial psychology (361 and 461). The courses in the 300 sequence provide general surveys of the field and are intended for non-majors who do not plan further in-depth study. The courses in the 400 sequence provide more comprehensive study with particular emphasis on research and methodology. The 400 series is intended primarily for psychology majors. It should be further noted that a student may not receive credit for both:

PSYC 331 and PSYC 431
PSYC 333 and PSYC 433
PSYC 335 and PSYC 435
or
PSYC 361 and PSYC 461

Honors. The Department of Psychology also offers a special program for the superior student which emphasizes independent study and research. Students may be eligible to enter the Honors Program who have a 3.3 grade average in all courses or the equivalent, who are in the junior year, and who demonstrate interest and maturity indicative of success in the program. Students in their sophomore year should consult their advisor or the Departmental Honors Committee for further information.

Course Code Prefix—PSYC

Sociology

Professor and Chairman: Kammeyer.
Professors: Dager, Hoffsommer (Emeritus), Janes, Lejins (Joint appointment with Institute of Criminal Justice and Criminology), Ritzer, Rosenberg, D. Segal.
Associate Professors: Brown, Cussler, Henkel, Hirzel, Lengermann, McIntyre, Meeker, Pease.
Assistant Professors: Blair, Braddock, Finsterbusch, Greisman, Harper, Hornung, J. Hunt, L. Hunt, Landry (Joint appointment with Afro-American Studies), Mayes, Miller, Parming, M. Segal.

The major in sociology offers: (1) a general education especially directed toward understanding the complexities of modern society and its social problems by using basic research and statistical skills; (2) a broad preparation for various types of professions, occupations, and services dealing with people; and (3) preparation of qualified students for graduate training in sociology.

The student in sociology must complete 45 hours of Departmental Requirements, none of which can be taken pass/fail. Thirty of these hours are in sociology course work which must be completed with a minimum grade average of C; 12 hours are in required core courses, and 18 hours are electives, of which 12 hours must be at the 300-400 level. Required core courses for all majors are SOCY 100 (Intro.); SOCY 201 (Statistics); SOCY 202 (Methods); SOCY 203 (Theory).

SOCY 100 should be taken in the freshman or sophomore year followed by SOCY 203 and SOCY 201 and then SOCY 202 should be taken.

Three hours of Mathematics (STAT 100; MATH 110, 111, 115, 140, 220 or their equivalents) are required of majors and are a prerequisite for SOCY 201.

The supporting course requirement for majors is 12 hours of a coherent series of courses from outside of the department which relate to the major substantive or research interests in sociology. These courses need not come from the same department, but at least 6 hours must be from the Division of Behavioral and Social Sciences. The following are among those recommended by the Sociology Undergraduate Committee for majors: ANTH 102, CMSC 103, ECON 205, GVPT 100, 170, 260; HIST 224, PHIL 170, 250, 455; PSYC 100. Further information about suggested supporting courses can be obtained in the Undergraduate Office (Room 2130, Taliaferro). Students should supply to the Undergraduate Office their proposed list of supporting courses for advisor's approval.

Urban Studies Program

Professor and Director: Murphy.
Professors: Harper, Janes, Kidd, Marando, Stone.
Assistant Professors: Brodsky, Christian, Forestano, McDonald.
Associate Professors: Arnold, Bish.
Lecturers: Golubin, Graves, Green, Knipe, Mingee, Walker.

In 1920 53% of the U.S. population was urban; by 1975 this percentage had jumped to 77%. The Institute for Urban Studies recognizes that this indicates a growing need not only for urban planners and managers, but also for people going into many diverse fields to have a firm grasp of the impact of the rapid urbanization process in this country. The interdisciplinary program offered by the Institute for Urban Studies is therefore designed for students interested in urban oriented careers and graduate study in urban affairs, as well as for students who wish to understand urban society. The faculty is drawn from six colleges and schools of the University on several campuses. The B.A. and B.S. degrees in Urban Studies can be given by any of the colleges or schools on any of the campuses of the University of Maryland.

The program assumes a comprehensive approach to urbanism and focuses on the total metropolitan area, including suburbs as well as central cities, their interrelationship, and state and federal policy. In addition to an interdisciplinary or multi-disciplinary staff, the program includes students from a variety of disciplines. The program centers around a set of seminars dealing with cities or urbanization as they involve economic factors, social problems, political and governmental activities, and environmental and physical aspects of urbanization. Contemporary urban problems will be emphasized and modern methodological and analytical techniques will be considered. In addition to the Urban Studies courses, an area of urban-related specialization from another discipline is selected. Each student, working closely with the Urban Studies advising office, designs an individualized program of study based on interests and future career plans. The advising office is located in Room 0104D, Woods Hall, x5718.

The Institute also offers an internship program. The students selecting this program have an opportunity to work in an urban-related office, focusing on their particular area of interest. The College Park Campus is well situated in an area including both major metropolitan areas, their suburbs, several new towns, and many small towns which are currently becoming urbanized. In addition to the internship possibilities, these areas offer a great source of both research and professional work experience for the advanced and graduate level student.

Requirements. In general, for a bachelor's degree in Urban Studies, a student should register in a division, college or school, satisfy University, division and college or school requirements, and complete course work in urban and urban-oriented subject matter.

The major in Urban Studies requires 42 credits:

15-24 in URBS courses

12-15 in urban oriented courses within a department or program selected as a disciplinary urban specialization.

9-12 within one of the three basic fields and from at least two departments.

The URBS courses include the following:

URBS 100—Introduction to Interdisciplinary Urban Studies
URBS 210—Survey of the Field of Urban Studies
URBS 220—Environmental and Technological Aspects of the Urban Community
URBS 320—The City and the Developing National Culture of the United States
URBS 350—Introduction to Urban Field Study
URBS 395—Pro-Seminar in Urban Litereture
URBS 399—Independent Study in Urban Topics
URBS 430—Urban Internship (6 credits)
URBS 450—Problems in Urban Law
URBS 480—Urban Theory and Simulation
URBS 499P—Selected Topics in Urban Studies

Departments and programs currently offering sufficient urban oriented courses for the disciplinary urban specialization include: Afro-American Studies, Agricultural and Extension Education, Agricultural and Resource Economics, American Studies, Anthropology, Architecture, Business Administration, Chemical Engineering, Chemistry, Civil Engineering, Computer Science, Criminal Justice and Criminology, Economics, Education, English, Family and Community Development, Fire Protection, Geography, Government and Politics, Health, History, Information Systems Management, Journalism, Meteorology, Physical Sciences, Psychology, Recreation, Sociology, and Speech and Dramatic Art. In addition to the departmental specializations, cross disciplinary specializations are available in Social Planning, Ecology of the Urban Environment, and Urban Management.

The *three basic fields* and the departments whose courses meet the requirements are:

1. *Social-economic-behavioral:* Afro-American Studies, Agricultural Extension Education, Agricultural and Resource Economics, Architecture, Business Administration, Criminal Justice and Criminology, Economics, Education, Family and Community Development, Cultural Geography, Government and Politics, Health, Information Systems Management, Journalism, Psychology, Recreation, and Sociology.

2. *Physical-Environmental:* Chemical Engineering, Chemistry, Civil Engineering, Computer Science, Fire Protection, Physical Geography, Geology, Health, Landscape, Architecture, Meteorology, Physical Sciences.

3. *Historical-cultural-humanistic:* Afro-American Studies, American Studies, Anthropology, Architecture, Education, English, History, Journalism, Radio and TV, Recreation, Sociology, and Speech and Dramatic Art.

Division of Human and Community Resources

The Division of Human and Community Resources includes the faculties and programs of the College of Education, the College of Human Ecology, the College of Physical Education, Recreation and Health, and the College of Library and Information Services. The programs of the Division are essentially professional. They are designed to prepare professionals interested in the quality of life of the individual and in the community factors which influence the interaction of people; those who are responsible for community health, recreation programs and activities; technical, public and school librarians, information scientists, and educational institutions.

The Division supports the development of research in areas of concern to faculty members in all the Departments and Colleges, and research teams which may cross departmental and College lines. Also, the Division seeks to stimulate the development of interdisciplinary courses and programs and the extension of professional expertise to the University and community at large, including planning for cooperation in international activities. The Center on Aging is an example of the multi- and inter-disciplinary program and research activity conducted by the Division.

The Division offers bachelor's, master's, and doctorate degrees in most of its programs in addition to various professional certificates. The professional programs are accredited by the National Council for Accreditation of Teacher Education, the Maryland State Department of Education, the American Library Association Committee on Accreditation, and the American Home Economics Association.

Specifically, the Colleges and their respective departments in the Division are:

College of Education. Department of Administration, Supervision and Curriculum, Department of Counseling and Personnel Services, Department of Early Childhood-Elementary Education, Department of Industrial Education, Department of Measurement and Statistics, Department of Secondary Education, Department of Special Education, Institute for Child Study, Social and Foundations Area.

College of Human Ecology. Department of Family and Community Development, Department of Food, Nutrition and Institution Administration, Department of Housing and Applied Design, Department of Textiles and Consumer Economics.

College of Physical Education, Recreation and Health. Department of Health Education, Department of Physical Education, and Department of Recreation.

College of Library and Information Services. This College is a separate professional College committed solely to graduate study and research.

College of Education

The College of Education offers programs for persons preparing for the following educational endeavors: 1) teaching in colleges, secondary schools, middle schools, elementary schools, kindergarten and nursery schools; 2) teaching in special education programs; 3) school librarians and resource specialists; 4) educational work in trades and industries; 5) pupil personnel, counseling and guidance services, 6) supervision and administration; 7) curriculum development, 8) rehabilitation programs; 9) evaluation and research.

Because of the location of the University in suburbs of the Nation's Capital, unusual facilities for the study of education are available to its students and faculty. The Library of Congress, the library of the United States Office of Education, and special libraries of other government agencies are accessible, as well as the information services of the National Education Association, the American Council on Education, United States Office of Education, and other organizations, public and private. The school systems of the District of Columbia, Baltimore and the counties of Maryland offer generous cooperation.

The teacher education programs preparing early childhood, elementary school and secondary school teachers at the bachelor's degree and master's degree levels, and the programs preparing school service personnel (elementary and secondary school principals, general school administrators, supervisors, curriculum coordinators, guidance counselors, student personnel administrators, and vocational rehabilitation counselors) at the master's, advanced graduate specialist and doctoral degree levels are all fully accredited by the National Council for Accreditation of Teacher Education.

Requirements for Admission. All students desiring to enroll in the College of Education must apply to the Director of Admissions of the University of Maryland at College Park and meet the admissions requirements detailed in Section I of this catalog. There are no specific secondary school course requirements for admission, but a foreign language is desirable in some of the programs, and courses in fine arts, trades, and vocational subjects are also desirable for some programs.

Candidates for admission whose high school or college records are consistently low are strongly advised not to seek admission to the College of Education.

Students with baccalaureate degrees who have applied for admission as special students must have received prior permission from the appropriate department.

Guidance in Registration. Students who intend to teach (except agriculture and physical education) should register in the College of Education in order that they may have the continuous counsel and guidance of the faculty directly responsible for teacher education at the University of Maryland. At the time of matriculation each student is assigned to a member of the faculty who acts as the student's advisor. The choice of subject areas within which the student will prepare to teach will be made under faculty guidance during the freshman year. The student will confer regularly with the faculty advisor in the College of Education responsible for his teaching major.

While students on the College Park Campus may transfer into an Education major at any time, it is recommended that this transfer occur prior to the junior year because of the required sequence of professional courses and experiences. Articulated programs have been developed with most of Maryland's community colleges to accommodate transferring to College Park after the completion of an Associate Arts degree in the community college.

General Requirements of the College. Minimum requirements for graduation are 120 semester hours. Specific program requirements for more than the minimum must be fulfilled.

In addition to the General University Requirements and the specific requirements for each curriculum, the College requires a minimum of 20 semester hours of education courses and 3 semester hours of speech.

Marks in all required upper division courses in education and in subjects in major and minor fields must be C or higher, except in the case of student teaching where a grade of S is required. A general average of C or higher must be maintained. (See Admission to Teacher Education.)

Exceptions to curricular requirements and rules of the College of Education must be recommended by the student's advisor, and department chairperson, and approved by the dean.

Students who are not enrolled in the College of Education but, who through an established cooperative program with another college, are preparing to teach and wish to register in professional education courses required for certification must meet all curricular and scholastic requirements of the College of Education.

Majors and Minors. There is no College requirement for a minor although many majors require an area of concentration to provide depth in a specific area of teaching specialty. Specific program requirements should be consulted.

Admission to Teacher Education. Students enrolled in an education major should confirm the status of their admission to Teacher Education with the Student Service Office of the College of Education when they enroll in the first education course or at the beginning of the semester immediately after earning 42 hours. Transfer students with 42 or more hours of acceptable transfer credit must apply at time of transfer. Transfer students must complete a minimum of 12 hours at Maryland before their applications will be processed. Post-graduate certification students and those working for certification only must apply at the beginning of their program. Application forms may be obtained from the College of Education Student Service Office.

In considering applications, the following guidelines have been established:

1. No student will be allowed to enroll in EDHD 300 and methods classes until he or she has received approval.
2. Approval is always granted with the understanding that the student will have a successful field experience in EDHD 300 and that any case may be reconsidered by the committee if subsequent academic performance declines.
3. Secondary education applicants must show evidence of ability to achieve on an above average level in courses directly related to their major field.
4. Applicants must be of good moral and ethical character. This will be determined as fairly as possible from such evidence as advisors' recommendations and records of serious Campus delinquencies.
5. Applicants must be physically and emotionally capable of functioning as teachers. This will mean freedom from serious chronic illness, emotional instability and communicable diseases, as determined in cooperation with the Health Service and the Counseling Center.
6. Applicants must be free of serious speech handicaps. A health certificate certifying absence of communicable disease is required for participation in any education course with a field experience component.

The purpose of the screening procedure associated with admission to teacher education is to insure that graduates of the teacher education program will be well prepared for teaching and can be recommended for certification with confidence.

Student Teaching. In order to be admitted to a course in student teaching, a student must have been admitted to the Teacher Education Program (see above), have a physician's certificate indicating that the applicant is free of communicable diseases, and the consent of the department. Application must be made with the Director of Laboratory Experiences by the middle of the semester which precedes the one in which student teaching will be done. Any applicant for student teaching must have been enrolled previously at the University of Maryland for at least one semester.

Certification of Teachers. The Maryland State Department of Education certifies to teach in the approved public schools of the state only graduates of approved colleges who have satisfactorily fulfilled subject-matter and professional requirements. The curricula of the College of Education fulfill State Department requirements for certification.

Degrees. The degrees of Bachelor of Arts and Bachelor of Science are conferred by the College of Education. The determination of which degree is conferred is dependent upon the amount of liberal arts study included in a particular degree program.

Organization. The College of Education is organized into seven departments and an institute as listed under the Division of Human and Community Resources. The non-departmental area of Social Foundations offers courses in history, philosophy, and sociology of education.

Unique specialized services for students, faculty, teachers and schools are offered through the following centers:

Arithmetic Center. The Arithmetic Center provides a Mathematics Laboratory for undergraduate and graduate students, and a program of clinical diagnostic and corrective/remedial services for children. Clinic services are a part of a program in elementary school mathematics at the graduate level.

Bureau of Educational Research and Field Services. The Bureau of Educational Research and Field Services has been established to (1) encourage and stimulate basic research bearing on different aspects of the educative process; (2) provide assistance in designing, implementing and evaluating research projects initiated by local school systems; and (3) coordinate school systems' requests for consultants with the rich and varied professional competencies that are available on the University faculty.

Curriculum Laboratory. The Curriculum Laboratory provides students, faculty and teachers in the field with materials and assistance in the area of curriculum. An up-to-date collection of curriculum materials includes texts, simulations, learning packages, programs, resource kits, charts, study guides, curriculum studies, and bibliographies.

Educational Technology Center. The center is designed as a multi-media facility for students and faculty of the College. It distributes closed-circuit television throughout the building, provides audio-visual equipment and service, a computer terminal, a learning lab, and instruction in all aspects of instructional materials, aids, and new media. Production and distribution rooms and a studio are available for closed-circuit television and a video tape system. Laboratories are available for graphic and photographic production with facilities for faculty research and development in the use of instructional media. Supporting the professional faculty in the operation of the center are media specialists.

Office of Laboratory Experiences. The Office of Laboratory Experiences is designed to accommodate the laboratory experiences of students preparing to teach by arranging for all field experiences. It also serves functions of program liaison, staff development, and research as they pertain to field experiences. This office administers the Teacher Education Centers in conjunction with the respective public school systems and serves as one of the liaison units between the College and the community. Student applications for field experiences, including student teaching, are processed through this office.

Music Educators National Conference Historical Center. The University of Maryland and the Music Educators National Conference established the MENC Historical Center in 1965 for the purpose of building and maintaining a research collection which would reflect the development and current practices in music education. Located in McKeldin Library, the center includes study space and is prepared to assist scholars in the field. Materials in the following categories are collected: archival documents of MENC, instructional materials; professional publications, curricular, administrative, and philosophical materials, manuscripts, personal letters and other historical materials.

Center for Young Children. A demonstration nursery-kindergarten program (1) provides a center in which individual professors or students may conduct research; (2) serves as a unit for undergraduate students to have selected experiences with young children, such as student teaching, child study, and observation of young children; (3) provides a setting in which educators from within and without the University can come for sources of ideas relative to the education of young children.

Reading Center. The Reading Center provides clinical diagnostic and corrective services to a limited number of children. These services are a part of the program in corrective/remedial reading offered to teachers on the graduate level.

Science Teaching Center. The Science Teaching Center has been designed to serve as a representative facility of its type to fulfill its functions of undergraduate and graduate science teacher education, science supervisor training, basic research in science education, aid to inservice teachers and supervisors, and consultative services, on all levels, kindergarten through community college. Its reference library features relevant periodicals, science and mathematics textbooks, new curriculum materials, and works on science subjects and their operational aspects. Its fully equipped research laboratory, in addition to its teaching laboratories for science methods courses, provides project space for both faculty and students.

Since 1962 the Science Teaching Center has served as the headquarters for the activities of the Science Teaching Materials Review Committee of the National Science Teachers Association. The Information Clearinghouse on Science and Mathematics Curricular Developments, the International Clearinghouse for A.A.A.S., N.S.F. and UNESCO, started here that year also. Within the center is gathered the "software" and "hardware" of science education in what is considered to be one of the most comprehensive collections of such materials in the world.

Student and Professional Organizations. The College sponsors a chapter of the Student National Education Association. A student chapter of the Council for Exceptional Children is open to undergraduate and graduate students in Special Education. A student chapter of the Music Educators National Conference

(MENC) is sponsored by the Department of Music, and the Industrial Education Department has a chapter of the American Society of Tool and Manufacturing Engineers and a chapter of the American Industrial Arts Association.

In several departments there are informal organizations of students.

Career Development Center University Credentials Service. All seniors graduating in the College of Education (except Industrial Technology majors) are required to file credentials with the Career Development Center. Credentials consist of the permanent record of a student's academic preparation and recommendations from academic and professional sources. An initial registration fee enables the Career Development Center to send a student's credentials to interested educational employers, as indicated by the student.

Students who are completing teacher certification requirements, advanced degrees and are interested in a teaching, administrative or research position in education, or who are completing advanced degrees in library science, may also file credentials.

Other services include vacancy listing in secondary schools and institutions of higher learning, notifications of interest-related positions, on-campus interviews with state and out-of-state school systems, and descriptive information on school systems throughout the country.

This service is also available to alumni. For further information contact Mrs. Anna Tackett, Assistant Director, Career Development Center, Terrapin Hall, or phone 454-2813.

Off-Campus Courses. Through the University College, a number of courses in education are offered in Baltimore, in other centers in Maryland and overseas. These courses are chosen to meet the needs of groups of students in various centers. In these centers, on a part-time basis, a student may complete a part of the work required for an undergraduate or a graduate degree. Announcements of such courses may be obtained by addressing requests to the Dean, University College, College Park, Maryland.

College of Education Departments, Programs and Curricula

Administration, Supervision and Curriculum

Professor and Chairman: Stephens.
Professors: J. P. Anderson, V. E. Anderson (Emeritus), Berman, Carbone, Dudley, James, McClure, McLoone, Newell, Perrin, Van Zwoll (Emeritus), Wedberg, Wiggin (p.t.).
Associate Professors: Goldman, Kelsey.
Assistant Professors: Bowering, Clague, Clemson, Goodrich, Splaine, Statom.
Lecturers: Esseff (p.t.), Helm (p.t.), Hempstead (p.t.).

The programs in this department are all at the graduate level and include preparation of school superintendents, principals, supervisors, curriculum directors, and administrative specialists in the areas of finance and business administration, personnel administration, public relations, and educational facilities. In addition, there are programs for the preparation of professors and research workers in all of the above areas. Preparation programs leading to administrative positions in community colleges and other institutions of higher learning are available through a joint major in administration-higher education.

Child Study, Institute for

Director and Professor: Morgan.
Professors: Bowie (Emerita), Chapin, Dittmann, Goering, Kurtz, Perkins, Thompson (Emeritus).
Associate Professors: Bennett, Eliot, Flatter, Gardner, Hardy, Hatfield, Huebner, Kyle, Matteson, Milhollan, Rogolsky, Wolk.
Assistant Professors: Ansello, Davidson, Green, Hunt, Koopman, Marcus, Shiflett, Svoboda, Tyler.
Lecturers: Brandon, Long.

The Institute for Child Study carries on the following activities: (1) It undertakes basic research in human development; (2) It synthesizes research findings from many sciences that study human beings; (3) It plans, organizes and provides consultant service programs of direct child study by in-service teachers in individual schools or in municipal, county or state systems; (4) It offers course programs and field training to qualified graduate students, preparing them to render expert consultant service to schools and for college teaching of human development.

Undergraduate courses and workshops are designed

for prospective teachers, in-service teachers and other persons interested in human development. Major purposes of undergraduate programs in human development are: (1) offering experiences which facilitate the personal growth of the individual, and (2) preparing people for vocations and developing programs, both of which seek to improve the quality of human life. These offerings are designed to help professionals and paraprofessionals acquire a positive orientation toward people and basic knowledge and skills for helping others.

Counseling and Personnel Services

Professor and Chairman: Marx.
Professors: Byrne, Hoyt, Magoon, Pumroy, Schlossberg.
Associate Professors: Allan, Birk, Greenberg, Lawrence, Medvene, Ray, Rhoads, Stern.
Assistant Professors: Boyd, Chasnoff, Colby (p.t.), Kafka, Levine, McMullan, Knefelkamp, Westbrook.
Lecturers: Elsmore (p.t.), Magrab (p.t.), Torrer (p.t.), Vandergoot.

Programs of preparation are offered by the Department of Counseling and Personnel Services at the master's degree, advanced graduate specialist, and doctoral degree levels for counselors in elementary and secondary schools, rehabilitation agencies, community agencies, college and university counseling centers. It also offers programs of preparation for other personnel services: college student personnel administration, visiting teacher and psychological services in schools.
Course Code Prefix—EDCP

Early Childhood-Elementary Education

Professor and Chairman: Sublett.
Early Childhood Education:
Professors: Goff, Leeper, Schindler (Emeritus).
Associate Professors: Amershek, Church, Heidelbach, Seefeldt.
Elementary Education:
Professors: Ashlock, Duffey, Emans, O'Neill, Weaver, J. W. Wilson, R. M. Wilson.
Associate Professors: Dietz, Eley, Gantt, Herman, Johnson, Roderick, Sullivan, Williams.
Assistant Professors: Anderson, Cole, Evans, Hill, Jantz, Knifong, Schumacher, Stant (Emerita), Sunal.
Instructors: Carter, Goldsmith, Leiserson, Mallory, Oliger (p.t.), Roach.
Lecturer: Koskimen (p.t.).

The Department of Early Childhood-Elementary Education offers two undergraduate curricula leading to the Bachelor of Science degree:

1. Early Childhood Education — for the preparation of teachers in nursery school, kindergarten and primary grades (grades one, two and three).
2. Elementary Education — for the preparation of teachers of grades one through six.

Students who wish to become certificated teachers for nursery school and/or kindergarten must follow the early childhood education curriculum (1. above). Students who seek certification for teaching the intermediate grades must follow the elementary education curriculum (2. above). Students who plan to teach in the primary grades can achieve certification in either 1. or 2.

Graduation Requirements. One hundred twenty (120) credits are necessary for graduation in Elementary Education and the Early Childhood program.

Early Childhood Education. (Nursery-Kindergarten-Primary). The Early Childhood Education curriculum has as its primary goal the preparation of nursery school, kindergarten and primary teachers.

Observation and student teaching are done in the University Nursery-Kindergarten School on the Campus and in approved schools in nearby communities.

Graduates receive a Bachelor of Science degree and meet the requirements for certification for teaching kindergarten, nursery school and primary grades in Maryland, the District of Columbia, Baltimore and many states. Students should have had extensive experience in working with children prior to the junior year.

Freshman Year	Semester I	Semester II
ENGL 101—Composition		
or		
ENGL 171—Honors Composition		
or		
General University Requirements alternative	3	
SPCH 100—Public Speaking		
or		
SPCH 110—Voice and Diction		
or		
HESP 202—Fundamentals of Hearing and Speech Science	3	
PSYC 100—Introduction to Psychology	3	
MUSC 155—Fundamentals for the Classroom Teacher	3	
ARTE 100—Fundamentals of Art Education		3
Biological Science with Lab from BOTN, ZOOL, MICB, or ENTM	4	
Physical Science with Lab from ASTR, GEOL, CHEM, PHYS, or ENES		4
Social Science or History course from ANTH, GEOG, ECON, GVPT, SOCY, HIUS, HIFN, or HIST		3
General University Requirements		6
	16	16
Sophomore Year		
MATH 210—Elements of Mathematics	4	
MATH 211—Elements of Geometry		4
LING 100—Introduction to Linguistics	3	
EDEL 299—School Service Semester*		2
U.S. History	3	
Social Science or History course from ANTH, GEOG, ECON, GVPT, SOCY, HIUS, HIFN, or HIST		3
General University Requirements	6	6
	16	15

*Volunteer Service Semester may be substituted. If so, one (1) additional semester hour will be required to complete 120 semester hours.

Junior and Senior Years	Semester I	Semester II
Semester V		
EDHD 300E—Human Development and Learning*	6	
MATH, or Science from ASTR, BOTN, CHEM, ENES, ENTM, GEOL, MICB, PHYS, or ZOOL	3	
PSYC 333—Child Psychology		
or		
FMCD 332—The Child and the Family	3	
General University Requirements	3	
	15	
Semester VI		
EDEL 424—Literature for Children and Young People — Advanced		3
Elective from courses with "ED" in the prefix and which are not listed in Professional Semesters A or B		3
General University Requirements		6
		12
Semester VII		
Professional Semester A*		
EDEL 340—Teaching Strategies for Young Children	3	
EDEL 341—The Young Child in His Social Environment	3	
EDEL 342—The Teaching of Reading — Early Childhood	3	
EDEL 332—Student Teaching, K-3	6	
	15	

*Prerequisite to Professional Semester B

Semester VIII		
Professional Semester B		
EDEL 343—The Young Child in His Physical Environment		3
EDEL 344—Creative Activities and Materials for the Young Child		3
EDEL 330—Student Teaching, Nursery School		3
MUED 450—Music in Early Childhood Education		3
EDSF 301—Foundations of Education		3
		15

*Interchangeable with Semesters VI and VII.

Elementary Education. This curriculum is designed for regular undergraduate students who wish to qualify for teaching positions in elementary schools. Students who complete the curriculum will receive the Bachelor of Science degree, and they will meet the Maryland State Department of Education requirements for the Standard Professional Certificate in Elementary Education. The curriculum also meets certification requirements in many other states, Baltimore and the District of Columbia.

	Semester I	Semester II
Freshman Year		
ENGL 101—Composition		
or		
ENGL 171—Honors Composition		
or		
General University Requirements alternative	3	
SPCH 100—Public Speaking		
or		
SPCH 110—Voice and Diction		
or		
HESP 202—Fundamentals of Hearing and Speech Science	3	
MUSC 155—Fundamentals for the Classroom Teacher	3	
ARTE 100—Fundamentals of Art Education		3
Biological Science with Lab from BOTN, ZOOL, MICB, or ENTM	4	
Physical Science with Lab from ASTR, GEOL, CHEM, PHYS, or ENES		4
Social Science or History course from ANTH, GEOG, ECON, GVPT, SOCY, HIUS, HIFN, or HIST	3	
General University Requirements		9
	16	16
Sophomore Year		
EDEL 299—School Service Semester*	2	
MATH 210—Elements of Mathematics	4	
MATH 211—Elements of Geometry		4
LING 100—Introduction to Linguistics	3	
PSYC 100—Introduction to Psychology		3
U.S. History	3	
Social Science or History course from ANTH, GEOG, ECON, GVPT, SOCY, HIUS, HIFN, or HIST		3
General University Requirements	3	6
	15	16

*Prerequisite to Professional Semester.

	Semester I	Semester II
Junior and Senior Years		
Semester V		
EDHD 300E—Human Development and Learning*	6	
MATH, or Science from ASTR, BOTN, CHEM, ENES, ENTM, GEOL, MICB, PHYS, or ZOOL	3	
PSYC 333—Child Psychology		
or		
FMCD 332—The Child and the Family	3	
General University Requirements	3	
	15	

*Prerequisite to student teaching.

Semester VI	
Professional Semester*	
EDEL 350—The Teaching of Language Arts—Elementary	3
EDEL 351—The Teaching of Mathematics—Elementary	3
EDEL 352—The Teaching of Reading—Elementary	3
EDEL 353—The Teaching of Science—Elementary	3
EDEL 354—The Teaching of Social Studies—Elementary	3
	15

Courses are blocked; i.e., one section of students remains together for all five methods courses. Students spend two days each week in school classrooms applying concepts and methods presented in methods courses.

Semester VII	
EDEL 333—Student Teaching	11
Semester VIII	
EDEL 424—Literature for Children and Young People—Advenced	3
EDSF 301—Foundations of Education	3
General University Requirements	6
Elective	4
	16

*Interchangeable with Semesters VI and VII.

Physical Education and Health Education Curriculum — Elementary School. Students majoring in elementary education may pursue an area of specialization in elementary school physical education and health education. Students interested in this area should consult the Dean of the College of Physical Education, Recreation and Health.

Industrial Education

Professor and Chairman: Maley.
Professors: Harrison, Luetkemeyer.
Associate Professors: Beatty, Crosby, Mietus, Stough, Tierney.
Assistant Professors: Elkins, Herschbach, Starkweather.
Instructors: Daly (p.t.), Gemmill, Giblin, Hastings, Hayman, Kemp (p.t.), Martin, Smith (p.t.), Vaglia.

The Department of Industrial Education offers programs leading to teacher certification in industrial arts and vocational-industrial education. It also offers a program in Industrial Technology which prepares individuals for supervisory and industrial management positions, and a technical education program for persons with advanced technical preparation who wish to teach in technical institutes or junior colleges.

Three curricula are administered by the Industrial Education Department: (1) Vocational-Industrial Education; (2) Industrial Arts Education; and (3) Industrial Technology. The overall offering includes both undergraduate and graduate programs leading to the degrees of: Bachelor of Science, Master of Education, Master of Arts, Doctor of Education, and Doctor of Philosophy.

The vocational-industrial curriculum may lead either to certification as a vocational-industrial teacher with no degree involved or to a Bachelor of Science degree, including certification. The University of Maryland is designated as the institution which shall offer the "Trade and Industrial" certification courses and hence the courses which are offered are those required for certification in Maryland. The vocational-industrial curriculum requires trade competence as specified by the Maryland State Plan for Vocational Education. A person who aspires to be certified should review the state plan and may well contact the Maryland State Department of Education officials. If the person has in mind teaching in a designated city or county, he or she may discuss his or her plans with the vocational-industrial official of that city or county inasmuch as there are variations in employment and training procedures.

Industrial Arts Education. The Industrial Arts Education curriculum prepares persons to teach industrial arts at the secondary school level. It is a four-year program leading to a Bachelor of Science degree. While trade or industrial experience contributes significantly to the background of the industrial arts teacher, previous work experience is not a condition of entrance into this curriculum. Students who are enrolled in the curriculum are encouraged to obtain work in industry during the summer months. Industrial arts as a secondary school subject area is a part of the general education program characterized by extensive laboratory experiences.

	Semester I	Semester II
Freshman Year		
General University Requirements	3	6
CHEM 102 or 103—General Chemistry	4	
SPCH 100—Public Speaking	3	
EDIN 101—Mechanical Drawing	2	
EDIN 102—Elementary Woodworking	3	
EDIN 112—Shop Calculations	3	
EDIN 262—Machine Shop Practice		3

EDIN	121—Mechanical Drawing		2
EDIN	122—Woodworking II		3
EDIN	134—Graphic Arts		3
	Total	18	17

Sophomore Year		Semester I	Semester II
General University Requirements		6	6
PHYS	111 or 112—Elements of Physics	3	
EDIN	127—Elec.-Electronics I	3	
EDIN	133—Power Transportation	3	
EDIN	241—Architectural Drawing	2	
ECON	205—Fundamentals of Economics		3
MATH	110—Introduction to Mathematics		3
EDIN	247—Elec.-Electronics I		3
EDIN	223—Arc and Gas Welding		1
EDIN	210—Foundry		1
	Total	17	17

Junior Year		Semester I	Semester II
General University Requirements (upper level)		3	6
EDHD	300—Human Development and Learning	6	
EDIN	226—General Metals	3	
EDIN	Elective (Laboratory)	4	
EDSF	301—Foundations of Education		3
EDIN	311—Lab Practicum in Industrial Arts		3
EDIN	450—Training Aids Development		3
	Total	16	15

Senior Year		Semester I	Semester II
EDIN	340—Cur., Instr. & Observ	3	
EDIN	347—Student Teaching in Secondary Schools	8	
EDSE	330—Principles & Methods of Secondary Education	3	
EDIN	464—Shop Organization and Management		3
EDIN	Elective		9
EDIN	466—Educational Foundations of Industrial Arts		3
	Total	14	15

Vocational-Industrial Education. The vocational-industrial curriculum is a four-year program of studies leading to a Bachelor of Science degree in education. It is intended to develop the necessary competencies for the effective performance of the tasks of a vocational teacher. In addition to establishing the adequacy of the student's skills in a particular trade and the development of instructional efficiency, the curriculum aims at the professional and cultural development of the individual. Courses are included which would enrich the person's scientific, economic, psychological and sociological understandings. The vocational-certification courses for the State of Maryland are a part of the curriculum requirements.

Persons pursuing this curriculum must present documentary evidence of having an apprenticeship or comparable learning period and journeyman experience. This evidence of background and training is necessary in order that the trade examination phase of the curriculum may be accomplished.

Persons having completed the necessary certification courses prior to working on the degree program may use such courses toward meeting graduation requirements. However, after certification course requirements have been met, persons continuing studies toward a degree must take courses in line with the curriculum plan and University regulations. For example, junior level courses cannot be taken until the student has reached full junior standing.

Freshman Year		Semester I	Semester II
General University Requirements		9	6
SPCH	100—Public Speaking	3	
ECON	205—Fundamentals of Economics		3
EDIN	112—Shop Calculations	3	
MATH	110—Introduction to Mathematics or		
MATH	105—Fundamentals of Mathematics		3
	Total	15	12

Sophomore Year		Semester I	Semester II
General University Requirements		3	6
Physical Sciences		3	3
PSYC	100—Introduction to Psychology	3	
CHEM	103 or equivalent		4
EDIN	Elective (Laboratory)	3	
	Total	12	13
Trade Examination			20

Junior Year		Semester I	Semester II
EDIN	450—Training Aids		3
EDIN	465—Modern Industry	3	
EDHD	300—Human Development and Learning	6	
EDIN	462—Occupational Analysis and Course Construction	3	
General University Requirements (upper level)		3	3
EDIN	471—Principles and History of Vocational Education		3
EDIN	357—Tests and Measurements		3
EDIN	Elective (Professional)		3
	Total	15	15

Senior Year		Semester I	Semester II
EDIN	350—Methods of Teaching	3	
EDSE	330—Principles and Methods of Secondary Education	3	
EDIN	347—Student Teaching in Secondary Schools	8	
EDIN	Electives (Professional)		6
EDSF	301—Social Foundations of Education		3
EDIN	464—Shop Organization and Management		3
General University Requirements (upper level)			3
	Total	14	15

*Student Teaching Requirement in Vocational Education

Persons currently teaching in the secondary schools with three or more years of satisfactory experience at that level are not required to take EDIN 347 — Student Teaching in Secondary Schools. Evidence of satisfactory teaching experience shall be presented in the form of written statements from the principal area supervisor and department head in the school where such teaching is done. Instead of the eight credits required for student teaching, the individual meeting the above qualifications will have eight additional semester hours of elective credits.

Elective Credits. Courses in history and philosophy of education, sociology, speech, psychology, economics, business administration and other allied areas may be taken with the permission of the student's advisor.

Elective courses in the technical area (shop and drawing) will be limited to courses and subjects not covered in the trade training experience. Courses dealing with advanced technology and recent improvements in field practices will be acceptable.

Vocational-Industrial Certification. To become certified as a trade industrial and service occupations teacher in the State of Maryland a person must successfully complete 18 credit hours of instruction.

The following courses must be included in the 18 credit hours of instruction:

EDIN	350—Methods of Teaching
EDIN	464—Laboratory Organization and Management
EDIN	457—Tests and Measurements
EDIN	462—Occupational Analysis and Course Construction

The remainder of the credit hours shall be met through the election of the following courses:

EDIN 450—Training Aids Development
EDIN 461—Principles of Vocational Guidance
EDIN 465—Modern Industry
EDIN 471—History and Principles of Vocational Education
EDCP 410—Introduction to Counseling and Personnel Services
EDCP 411—Mental Hygiene in the Classroom
Educational Psychology or its equivalent

A person in Vocational-Industrial Education may use his or her certification courses toward a Bachelor of Science degree. In doing so the general requirements of the University and the college must be met. A maximum of 20 semester hours of credit may be earned through examination in the trade in which the student has competence. Prior to taking the examination, the student shall provide documentary evidence of his or her apprenticeship or learning period and journeyman experience. For further information about credit by examination refer to the academic regulations.

Industrial Technology. The Industrial Technology curriculum is a four-year program leading to a Bachelor of Science degree. The purpose of the program is to prepare persons for jobs within industry and, as such, it embraces four major areas of competence: (a) technical competence; (b) human relations and leadership competence, (c) communications competence; and (d) social and civic competence.

		Semester I	Semester II
Freshman Year			
General University Requirements		6	6
SOCY	100—Sociology of American Life	3	
EDIN	101—Mechanical Drawing I or (Transfr)	2	
EDIN	112—Shop Calculations or (Transfr)	3	
EDIN	121—Mechanical Drawing II		2
EDIN	122—Woodworking II		
or			
EDIN	127—Electricity-Electronics I	3	
EDIN	223—Arc and Gas Welding		1
EDIN	262—Machine Shop Practice I		3
EDIN	210—Foundry		1
MATH	110—Introduction to Mathematics		
or			
MATH	115—Introductory Analysis		3
	Total	17	16

		Semester I	Semester II
Sophomore Year			
General University Requirements		3	6
EDIN	124—Sheet Metal Work	2	
BMGT	110—Business Enterprise	3	
SPCH	107—Public Speaking		2
PHYS	111-112—Elements of Physics (Mechanics and Heat and Sound), (Magnetism, Electricity and Optics	3	3
or			
PHYS	121-122—Fundamentals of Physics (Mechanics and Heat), (Sound, Optics, Magnetism, Electricity)	4	4
ECON	201—Principles of Economics		
or			
ECON	205—Fundamentals of Economics	3	
PSYC	100—Introduction to Psychology		3
EDIN	184—Organized and Supervised Work Experience*	3	
		17-18	14-15

		Semester I	Semester II
Junior Year			
General University Requirements (upper level)		3	3
PSYC	361—Survey of Industrial Psychology	3	
CHEM	103—General Chemistry	4	
EDIN	Elective	2	
EDIN	Shop Elective or (Transfr)		2
EDIN	324—Organized and Supervised Work Experience*	3	
EDIN	443—Industrial Safety Education I	2	
EDIN	444—Industrial Safety Education II		2
BMGT	360—Personnel Management		3
SOCY	462—Industrial Sociology		3
	**	3	3
	Total	20	16

		Semester I	Semester II
Senior Year			
General University Requirements (upper level)		3	
BMGT	362—Industrial Relations	3	
BMGT	385—Production Management		3
EDIN	465—Modern Industry		
or			
EDIN	425—Industrial Training in Industry		
or			
EDIN	475—Recent Technological Developments in Products and Processes	3	3
EDIN	Elective		2
EDIN	Shop Elective or (Transfr)		2
	*	6	3
	Total	15	13

*Summer Session
"Transfr" refers to technical credit to be transferred by A.A. degree students.
** refers to technical credit for A.A. degree students or Option Courses for regular students.
Further information on option courses is available in the Industrial Education Department.

Measurement and Statistics

Professor and Chairman: Giblette.
Professors: Dayton, Stunkard.
Associate Professors: Johnson, Schafer, Sedlacek.
Assistant Professor: Macready.
Lecturers: Mitzel (p.t.), Wilson.

For Advanced Undergraduates and Graduates. Programs available in the Department of Measurement and Statistics lead to the Master of Arts degree (thesis or non-thesis option) and to the Doctor of Philosophy degree. In addition to the general master's degree, three specialist programs are available: evaluation specialist, statistical analysis specialist, and measurement specialist. Potential job placements include: evaluators of various projects in curriculum offices in state or county school systems; federal projects; government statistical positions; private research organizations; testing specialists in government, state and local school systems, and private test construction organizations. The doctoral program is intended to produce persons qualified to: teach at the college level in the field of educational measurement and research methodology; conduct research studies in the field of education; advise in the conduct of research studies; and administer programs in the above areas.

Persons interested in majoring in the department must display above average aptitude and interest in quantitative methods as applied in the behavioral sciences.

Course Code Prefix—EDMS

Secondary Education

Professor and Chairman: Risinger.
Art Education–
Professor: Lembach.
Associate Professors: Longley, McWhinnie.
Lecturer: White.
Business Education–
Associate Professors: Anderson, Peters.
Instructors: Hall, Vignone.
Lecturer: Baker.
Dance Education–
Instructor: Sloan.
Distributive Education–
Assistant Professor: Ricci.
English Education–
Professor: Woolf.
Assistant Professor: James.

Foreign Language Education–
Associate Professor: Plister.
Assistant Professors: Baird, DeLorenzo.
Home Economics Education–
Assistant Professors: Brewster, Baird.
Lecturers: Straw (p.t.), Westerberg.
Library Science Education–
Professor: James.
Assistant Professor: Mendeville.
Lecturer: Fitzgibbons.
Mathematics Education–
Associate Professors: Davidson, Fey, Henkelman.
Assistant Professor: Cole.
Music Education–
Professors: Folstrum, Taylor.
Assistant Professors: Shelley, Kuhn.
Physical Education (Men)–
Lecturer: Vaccaro.
Physical Education (Women)–
Instructor: Marsh.
Reading Education–
Associate Professor: Brigham.
Assistant Professor: Davey.
Lecturer: Lazar.
Science Education–
Professors: Gardner, Lockard.
Associate Professor: Layman.
Assistant Professors: Heikkinen, Ridky, Wheatley.
Social Studies Education–
Professors: Campbell, Grambs.
Associate Professors: Adkins, Cirrincione, Farrell, Funaro.
Assistant Professor: Ruchkin.
Speech Education–
Associate Professor: Carr.
Assistant Professor: Freimuth.

Secondary Education. The Department of Secondary Education is concerned with the preparation of teachers of middle schools, junior high schools, and senior high schools in the following areas: art, dance, distributive education, English, foreign languages, general business, home economics, library science, mathematics, music, secretarial education, science, social studies, and speech and drama.

In the areas of art, music, dance, and library science, teachers are prepared to teach in both elementary and secondary schools. Majors in physical education and agriculture are offered in the College of Physical Education, Recreation, and Health and the College of Agriculture in cooperation with the College of Education. Majors in reading are offered only at the graduate level, requiring a bachelor's degree, certification, and at least two years of successful teaching experience as prerequisites.

All students who pursue the Bachelor of Arts degree in secondary education are required to complete two years (12 semester hours) or the equivalent of a foreign language on the college level. If a student has had three years of one foreign language or two years of each of two foreign languages as recorded on his or her high school transcripts, he or she is not required to take any foreign languages in the college, although he or she may elect to do so.

If a student is not exempt from the foreign language requirements, he or she must complete courses through the 104 level of a modern foreign language or 204 level of a classical language.

In the modern languages, French, German, and Spanish, the student should take the placement test in the language in which he or she has had work if he or she wishes to continue the same language; his or her language instruction would start at the level indicated by the test. With classical languages, the student would start at the level indicated in the catalog.

For students who come under the provisions above, the placement test may also serve as a proficiency test and may be taken by a student any time (once a semester) to try to fulfill the language requirement.

Students who have studied languages other than French, German, or Spanish, or who have lived for two or more years in a foreign country where a language other than English prevails, shall be placed by the chairman of the respective language section, if feasible, or by the chairmen of the foreign language departments. Native speakers of a foreign language shall satisfy the foreign language requirements by taking 12 semester hours of English.

All students who elect the secondary education curriculum will fulfill the preceding *general* requirements and also prepare to teach one or more school subjects which will involve meeting *specific* requirements in *particular* subject matter fields.

The Bachelor of Arts degree is offered in the teaching fields of art, English, foreign languages, mathematics, social studies, and speech and drama. The Bachelor of Science degree is offered in art, dance, distributive education, general business, home economics, library science, mathematics, music, science, secretarial education, and speech and drama.

The student teaching semester is a full-time commitment and interference with this commitment because of employment is not permitted.

Living arrangements, including transportation for the student teaching assignments, are considered the responsibility of the student.

Art Education. Students in art education may select one of three programs: elementary (K-6), secondary (6-12), or dual (K-12) Art Education. The three programs are shown below.

Elementary Art Education (K-6)

Freshman Year	Semester I	Semester II
General University Requirements	6	6
ARTH 100—Introduction to Art		3
ARTS 110—Drawing I	3	
ARTS 100—Design I or APDS 101 or ARTE 100	3	
SPCH 100—Public Speaking		3
Elective	3	3
	15	15

Sophomore Year	Semester I	Semester II
EDSE 260—Introduction to Art Education*	3	
General University Requirements	6	3
ARTH 260 and 261—Art History	3	3
ARTS 220—Painting I		3
CRAF 220—Ceramics		3
Elective	3	3
	15	15

Junior Year	Semester I	Semester II
EDHD 300—Human Development and Learning	6	
General University Requirements	3	6
ARTS 330—Sculpture	3	
EDSE 441—Practicum in Art Education	3	
Electives		3
ARTS 340—Printmaking or APDS 230—Silkscreen Printing		3
APDS 103—Three Dimensional Design or ARTS 200 or APDS 102		3
	15	15

Senior Year	Semester I	Semester II
EDSF 301—Foundations of Education	3	
EDSE 470—Teaching of Art Criticism	3	
Electives	6	
Elective in Crafts	3	
EDEL 412—Art in the Elementary School		3
Education Elective		3
EDEL 411—The Child and Curriculum or EDEL 322		3
EDEL 337—Student Teaching in Elementary Schools — Art		8
	15	17

*Admission to Teacher Education processed in this course

Secondary Art Education (6-12)

		Semester I	Semester II
Freshman Year			
SPCH	100—Public Speaking		3
	General University Requirements	3	3
ARTH	100—Introduction to Art	3	
ARTS	100—Design I		
	or		
APDS	101		
	or		
ARTE	100	3	
ARTS	110—Drawing I		3
	Foreign Language[1] or electives	3	3
APDS	103—Three Dimension Design or ARTS 200 or APDS 102		3
	Electives	3	
		15	15

[1]Required foreign language credit, 2 years or equivalent

		Semester I	Semester II
Sophomore Year			
EDSE	260—Introduction to Art Education*	3	
	General University Requirements	6	6
	Foreign Language or Electives	3	3
ARTH	260, 261—Art History	3	3
ARTS	220—Painting I		3
ARTS	210—Drawing II	3	
		18	15

		Semester I	Semester II
Junior Year			
EDHD	300—Human Development and Learning	6	
	General University Requirements	6	6
ARTS	340—Printmaking I		
	or		
APDS	230—Silkscreen Printing	3	
ARTS	330—Sculpture I		3
	Electives		3
EDSE	441—Practicum in Art Education		3
		15	15

		Semester I	Semester II
Senior Year			
EDSF	301—Foundations of Education	3	
CRAF	220—Ceramics	3	
	Elective in Crafts	3	
EDSE	470—Teaching of Art Criticism		3
EDSE	340—Curriculum, Instruction, Observation in Art	3	
	Education Elective		3
EDSE	330—Principles and Methods in Secondary Education		3
EDSE	360—Student Teaching in Secondary Schools		8
		12	17

*Admission to Teacher Education processed in this course

Dual K through 12 Art Education (K-12)

		Semester I	Semester II
Freshman Year			
	General University Requirements	6	9
ARTH	100—Introduction to Art	3	
ARTH	260—Art History		3
ARTS	100—Design I or ARTE 100 or APDS 101	3	
ARTS	110—Drawing I	3	
SPCH	100—Public Speaking		3
		15	15

		Semester I	Semester II
Sophomore Year			
EDSE	260—Introduction to Art Education*	3	
	General University Requirements	3	3
CRAF	220—Ceramics	3	
ARTH	261—Art History	3	
ARTS	220—Painting I		3
	Elective in Crafts		3
	Elective	3	3
ARTS	200—Design II or APDS 102 or APDS 103		3
		15	15

		Semester I	Semester II
Junior Year			
	General University Requirements	6	3
EDHD	300—Human Development and Learning	6	
ARTS	330—Sculpture	3	
EDEL	411—Child and Curriculum or EDEL 322		3
EDEL	412—Art in the Elementary School		3
EDEL	337—Student Teaching in Elementary Schools — Art		6
		15	15

		Semester I	Semester II
Senior Year			
EDSF	301—Foundations of Education	3	
	Electives	6	
ARTS	340—Printmaking		
	or		
APDS	230—Silkscreen Printing	3	
EDSE	340—Curriculum, Instruction and Observation in Art		3
EDSE	330—Principles and Methods in Secondary Education		3
EDSE	360—Student Teaching in Secondary Schools — Art		6
EDSE	470—Teaching of Art Criticism	3	
EDSE	441—Practicum in Art Education	3	
		18	12

*Admission to Teacher Education processed in this course

Business Education. Three curricula are offered for preparation of teachers of business subjects. The General Business Education curriculum qualifies for teaching all business subjects except shorthand. Providing thorough training in general business, including economics, this curriculum leads to teaching positions on both junior and senior high school levels.

The Secretarial Education curriculum is adapted to the needs of those who wish to become teachers of shorthand as well as other business subjects.

The Distributive Education curriculum prepares students for vocational teaching requirements in cooperative marketing and merchandising programs.

General Business Education

		Semester I	Semester II
Freshman Year			
	General University Requirements	9	6
SPCH	100—Public Speaking		3
BMGT	110—Elements of Business Enterprise		3
MATH	110, 111—Introduction to Mathematics	3	3
EDSE	100, 101—Principles of Typewriting and Intermediate Typewriting	2	2
	Total	14	17

		Semester I	Semester II
Sophomore Year			
	General University Requirements	3	3
ECON	105—Economic Developments		3
ECON	201, 203—Principles of Economics	3	3
EDSE	200—Office Typewriting Problems	2	
	Business Electives	3	
EDSE	201—Survey of Office Machines	2	
BMGT	220, 221—Principles of Accounting	3	3
GEOG	203—Introductory Economic Geography		3
	Total	16	15

		Semester I	Semester II
Junior Year			
EDHD	300S—Human Development and Learning	6	
IFSM	401—Electronic Data Processing		3
BMGT	350—Marketing Principles and Organization	3	
BMGT	380—Business Law		3
	Elective 300 or 400 level course in Economics		3
	General University Requirements	3	6
	Electives	6	
	Total	18	15

		Semester I	Semester II
Senior Year			
EDSF	301—Foundations of Education	3	
IFSM	402—Electronic Data Processing Applications	3	
EDSE	341—Curriculum, Instruction, and Observation — Business Subjects	3	
EDSE	330—Principles and Methods of Secondary Education	3	
EDSE	300—Techniques of Teaching Office Skills		3
EDSE	361—Student Teaching in the Secondary Schools		8

EDSE 415—Financial and Economic Education	3	
EDSE 416—Financial and Economic Education		3
Total	15	14

Distributive Education

Freshman Year	Semester I	Semester II
General University Requirements	9	9
BMGT 110—Business Enterprise	3	
SPCH 100—Public Speaking		3
ECON 201—Principles of Economics	3	
ECON 203—Principles of Economics		3
Total	15	15

Sophomore Year	Semester I	Semester II
BMGT 220—Principles of Accounting	3	
BMGT 221—Principles of Accounting		3
Business Electives	9	12
General University Requirements	3	
Total	15	15

Junior Year	Semester I	Semester II
EDHD 300S—Human Development and Learning	6	
BMGT 350—Marketing Principles and Organization	3	
BMGT 351—Marketing Management	3	
BMGT 360—Personnel Management I	3	
BMGT 353—Retailing		3
BMGT 380—Business Law		3
EDSE 423B—Field Experience — DE		3
General University Requirements (Upper Division)	3	6
Total	18	15

Senior Year	Semester I	Semester II
EDSF 301—Foundations of Education	3	
EDSE 420—Organization and Coordination of Distributive Education Programs	3	
BMGT 352—Advertising	3	
EDSE 341—Curriculum, Instruction and Observation		3
EDSE 330—Principles and Methods of Secondary Education		3
EDSE 363—Student Teaching in Secondary Schools		8
Electives	6	
Total	15	14

Secretarial Education

Freshman Year	Semester I	Semester II
General University Requirements	9	9
SPCH 100—Public Speaking		3
EDSE 100—Principles of Typewriting (if exempt, BMGT 110)	2	
EDSE 101—Intermediate Typewriting		2
EDSE 102, 103—Principles of Shorthand I, II	3	3
General University Requirements	3	
Total	17	17

Sophomore Year	Semester I	Semester II
Business Electives	3	3
BMGT 220, 221—Principles of Accounting	3	3
ECON 201, 203—Principles of Economics	3	3
EDSE 200—Office Typewriting Problems	2	
EDSE 201—Survey of Office Machines		2
EDSE 204—Advanced Shorthand and Transcription	3	
EDSE 205—Problems in Transcription		3
Total	14	14

Junior Year	Semester I	Semester II
EDHD 300S—Human Development and Learning	6	
EDSE 304—Administrative Secretarial Procedures		3
BMGT 380—Business Law		3
Electives	3	3
IFSM 401—Electronic Data Processing	3	
Elective in General University Requirements (Upper Division)	3	6
Total	15	15

Senior Year	Semester I	Semester II
EDSF 301—Foundations of Education	3	
EDSE 305—Secretarial Office Practice	3	
EDSE 300—Techniques of Teaching Office Skills		3
EDSE 341—Curriculum, Instruction and Observation — Business Subjects	3	
EDSE 330—Principles and Methods of Secondary Education		3
EDSE 361—Student Teaching in Secondary Schools		8
Electives — 300 or 400 Level	6	3
Total	15	17

Dance Education. The Dance Education curriculum prepares students for teaching in the public schools, for graduate study, and for possible teaching in college. At present, only a dual program (K-12) is available, but K-6 and 6-12 options are in preparation. The K-12 program is as follows:

Freshman Year	Semester I	Semester II
DANC 100	2	
DANC 104		2
General University Requirements	6	6
SPCH 100		3
Electives		3
DANC 200	3	
Art-Studio or History	3	
Total	14	14

Sophomore Year	Semester I	Semester II
DANC 248A, 348A	2	2
DANC 208		3
DANC 102		2
DANC 290	2	
General University Requirements	6	3
Electives	3	4
Total	13	14

Junior Year	Semester I	Semester II
DANC 389A		2
Dance Technique Elective	2	
DANC 305	3	
DANC 498		2
DANC 470		3
DANC 492	3	
DANC 482 or 484	3	
MUSC 130, or 430, or 431		3
EDHD 300	6	
PHED 489D		3
EDEL 411 or 322		3
Total	17	16

Senior Year	Semester I	Semester II
Dance Technique Elective	2	
General University Requirements (Upper Division)	9	
EDSE 300		3
EDSE 362		6
EDEL 331		6
EDSE 342		3
EDSF 301	3	
Total	14	18

English Education. A major in English requires 45 semester hours as follows: ENGL 201; 211 or 212; 481; 403 or 404 or 405; or 221 or 222; 482; 493; three hours each in a type, and period; 9 hours electives. Related Fields SPCH 100 and 240.

Freshman Year	Semester I	Semester II
General University Requirements	12	6

SPCH	100—Public Speaking		3
Foreign Language		3	3
Elective			3
ENGL	101—Introduction to Writing		
	or		
ENGL	171—Honors Composition		3
		15	18

Sophomore Yaar		Semester I	Semester II
General University Requirements			3
ENGL	201, 202—World Literature	3	3
SPCH	240—Oral Interpretation		3
Foreign Language		3	3
Elective		3	3
ENGL	—(type)	3	
ENGL	—(period)	3	
		15	15

Junior Year		Semester I	Semester II
EDHD	300S—Human Development and Learning	6	
EDSF	301—Foundations of Education		3
EDSE	330—Principles and Methods of Secondary Education		3
EDSE	288—Field Experience (optional)		1
American and English Literature		3	3
ENGL	403, 404, or 405	3	
ENGL	481—Introduction to English Grammar	3	
General University Requirements (upper level)		3	3
ENGL	482—History of the English Language		3
		18	16

Senior Year		Semester I	Semester II
EDSE	489—Field Experience	1	1
EDSE	344—Curriculum, Instruction and Observation — English	3	
EDSE	453—The Teaching of Reading in the Secondary School		3
EDSE	364—Student Teaching — English		8
ENGL	493—Advanced Expository Writing	3	
ENGL Electives		6	
General University Requirements (upper level)		3	
		16	12

Foreign Language Education. The Foreign Language Education curriculum is designed for prospective foreign-language teachers in secondary schools.

Classical Language-Latin. A minor for teaching Latin requires 24 prescribed semester hours based upon two years of high school Latin. These students should take LATN 203, 204, 305, 351, 352, 361, 401, 402. Students who have had four years of high school Latin should begin with LATN 305 and should select two additional courses from among LATN 403, 404, 405.

Prospective Latin teachers are urged to elect courses which will lead to a second area of concentration.

Modern Foreign Languages. All prospective foreign language teachers must take a minimum of 30 semester hours in a foreign language plus 12 hours of electives in a related area for a total of 42 hours; the advisor must approve the 12 hours of "related area" credit. The following requirements must be met within the 30 required hours: one year of conversation, one year of advanced grammar and composition, one year of survey of literature, one year of advanced literature (400 level) and one semester of advanced civilization (300 or 400 level) or previously approved equivalents.

*Foreign Language Education majors are strongly urged to elect courses which will lead to a second area of concentration (i.e. a second foreign language, teaching English to speakers of other languages, English, social studies, etc.).

Students who plan to teach a foreign language must contact their advisor during the freshman year in order that they can plan an integrated program of specialized professional and liberal education.

Secondary Foreign Language Education

Freshman Year		Semester I	Semester II
General University Requirements		9	6
SPCH	100—Public Speaking		3
Intermediate Foreign Language (or appropriate level as determined by placement exam)		3	3
Electives*		3	3
Total		15	15

Sophomore Year		Semester I	Semester II
General University Requirements		3	3
Foreign Language—Grammar and Composition		3	3
Foreign Language—Survey of Literature		3	3
Foreign Language—Advanced Conversation		3	3
Electives*		3	3
Total		15	15

Junior Year		Semester I	Semester II
General University Requirements (upper level)		6	
EDHD	300S—Human Development and Learning		6
Foreign Language—Literature (400 level)		3	3
Foreign Language—Civilization		3	
Electives in Foreign Language or Related Area (i.e., advanced language courses, second language, introduction to Linguistics, Cultural Anthropology, Historic Geography of the Hispanic World, etc.)*		3	3
Foreign Language—Elective (400 level)			3
Total		15	15

Senior Year		Semester I	Semester II
EDSF	301—Foundations of Education		3
EDSE	330—Principles and Methods of Secondary Education	3	
EDSE	345—Curriculum Observation	3	
EDSE	365—Student Teaching in the Secondary Schools	8	
Elective from EDAD 440—Audio Visual Education, EDSE 488B—Foreign Languages and Career Education, EDSE 499H—Creating Cross-Cultural Contrasts, EDSE 499T—Teaching English as a Second Language, EDSE 499X—Bilingual Education, or EDSE 453—The Teaching of Reading in the Secondary School		3	
General University Requirements (upper level)			3
Electives*			9
Total		17	15

Home Economics Education. The Home Economics Education curriculum is designed for students who are preparing to teach home economics. It includes study of each area of home economics and the supporting disciplines.

Fifteen hours of the total curriculum include an area of concentration which must be unified in content and which will be chosen by the student.*

Freshman Year		Semester I	Semester II
FMCD	250—Decision Making in Family Living	3	
FMCD	105—Introduction to Family Living	3	
FOOD	110—Food and Nutrition of Individuals and Family		
	or		
NUTR	100—Elements of Nutrition	3	
EDSE	151—Bases for Home Economics Curricula	1	
TEXT	105—Textiles in Contemporary Living	3	
General University Requirements		3	6
APDS	101—Fundamentals of Design		3
PSYC	100—Introduction to Psychology		3
SOCY	100—Introduction to Sociology		3
Total		16	15

Sophomore Year		Semester I	Semester II
SPCH	100—Public Speaking	3	
TXAP	221—Apparel I (if exempted, may take TXAP 222 or TXAP 425)	3	
CHEM	103—College Chemistry I	4	

General University Requirements		6	6
HSAD	240—Design and Furnishings in the Home		
	or		
HSAD	241—Family Housing		3
EDSE	210—Teaching Roles in Home Economics Education		1
FOOD	200—Scientific Principles of Food		3
FMCD	332—The Child in the Family		
	or		
EDHD	411—Child Growth and Development		3
	Total	16	16

Junior Year		Semester I	Semester II
EDHD	300S—Human Development and Learning	6	
FMCD	280—Household Equipment and Space Utilization		
	or		
FMCD	443—Consumer Problems		
	or		
FMCD	341—Personal and Family Finance	3(4)	
FOOD	260—Meal Management	3	
ECON	205—Fundamentals of Economics	3	
FMCD	344—Resident Experience in Home Management		
	or		
FMCD	344B—Practicum in Home Management	3	
EDSE	380—Field Experience in Organization and Administration of a Child Development Laboratory		1
EDSE	425—Curriculum Development in Home Economics		3
Area of Concentration			6
General University Requirements			9
Total		18(19)	19

Senior Year		Semester I	Semester II
EDSE	347—Curriculum, Instruction, and Observation	3	
EDSE	330—Principles and Methods of Secondary Education	2	
EDSE	489—Field Experience	1	
EDSE	370—Student Teaching in Secondary Schools — Home Economics	8	
FMCD	260—Family Relations		
	or		
SOCY	443—The Family and Society		3
EDSF	301—Foundations of Education		3
ZOOL	101—General Zoology		
	or		
MICR	200—General Microbiology		4
Area of Concentration			9
Total		14	19

*Area of Concentration: 15 semester hours.
A) Including maximum of two home economics courses in applied area, with the remainder of the 15 hours in supporting behavioral, physical and biological sciences, philosophy, geography, and history
B) Of the 15 hours, nine must be upper divisional courses.

Library Science Education. All students anticipating work in library science education should consult with advisors in this area at the beginning of the freshman year. Students enrolled in this curriculum will pursue a Bachelor of Arts degree with an area of concentration of 36 hours in one of the following: humanities, social sciences, science, or foreign languages. Students may concentrate in a subject area subsumed under one of these four fields, or they may choose a broad spectrum of courses in one of the four areas under the guidance of their advisors. The minor of 18 hours will be library science education.

Students in library science education will complete eight semester hours in directed library experience as their student teaching requirement. It will involve two and a half days per week, for 16 weeks. This period will be divided into two sections, with eight weeks each in a secondary and elementary school. A concurrent seminar will also be a part of this experience. Students completing this curriculum will be eligible for certification as an Educational Media Associate, Level I, and will qualify to work in school media centers under the supervision of a Media Generalist, Level II.

Freshman Year		Semester I	Semester II
General University Requirements		6	6
SPCH	100—Public Speaking	3	
Electives		6	3
Area of Concentration			6
Total		15	15

Sophomore Year		Semester I	Semester II
General University Requirements		6	3
Electives		3	3
Area of Concentration		6	9
Total		15	15

Junior Year		Semester I	Semester II
General University Requirements (300 and above level)		3	6
EDHD	300—Human Development and Learning	6	
EDSE	331—Introduction to Educational Media Services*	3	
EDSE	381—Basic Reference and Information Sources	3	
EDSE	382—Cataloging and Classification of Materials		3
EDSE	383—Library Materials for Children and Youth		3
EDEL	322—Curriculum and Instruction — Elementary		3
Total		15	15

*Prerequisite to EDSE 381

Senior Year		Semester I	Semester II
Area of Concentration		12	3
EDSF	301—Foundations of Education	3	
EDAD	441—Graphic Materials for Instruction		3
EDSE	385—Media Center Administration and Services	3	
EDSE	386—Student Teaching in School Media Centers — Elementary		4
EDSE	387—Student Teaching in School Media Centers — Secondary		4
Total		16	14

Mathematics Education. A major in mathematics education requires the completion of MATH 241 or its equivalent, and a minimum of 15 semester hours of mathematics at the 400 level (excluding MATH 490); 400 level courses beyond those prescribed (450, 402 or 403, 430 or 431) should be selected in consultation with the mathematics education advisor. The mathematics education major must be supported by one of the following science sequences: CHEM 103 and 104, or 105 and 106; PHYS 221 and 222, or 161 and 262, or 191 and 192, or 141 and 142; BOTN 101 and three additional hours in BOTN courses; ZOOL 101 and three additional hours in ZOOL courses; ASTR 180 and 110 and three additional hours in ASTR (none of which include ASTR 100 or 105). The following sample program is one way to fulfill requirements.

Freshman Year		Semester I	Semester II
SPCH	100—Basic Principles of Speech Communication	3	
MATH	140, 141—Analysis I, II	4	4
Science Requirement		3-5	3-5
General University Requirements		3	6
		13-15	13-15

Sophomore Year		Semester I	Semester II
MATH	240, 241—Linear Algebra, Analysis III	4	4
General University Requirements		6	6
CMSC	103 or 110	3	
Electives		2-4	5-7
		15-17	15-17

Junior Year	Semester I	Semester II
MATH 430—Geometric Transformations or MATH 431—Foundations of Geometry	3	
MATH 402—Algebraic Structures or MATH 403—Introduction to Abstract Algebra	3	
MATH 450—Fundamental Concepts of Mathematics		3
EDHD 300S—Human Development and Learning	6	
EDSE 350—Curriculum, Instruction, Observation — Mathematics		3
Mathematics Electives (400 level)		3
General University Requirements	3	6
	15	15

Senior Year	Semester I	Semester II
Mathematics Electives (400 level)		3
EDSF 301—Foundations of Education		3
EDSE 330—Principles and Methods of Secondary Education	3	
EDSE 372—Student Teaching in Secondary School Mathematics	8	
Education Elective	3	
Electives		10
	14	16

Music Education. The curriculum in music leads to a Bachelor of Science degree in education with a major in music education. It is planned to meet the growing demand for specialists, supervisors and resource teachers in music in the schools. The program provides training in the teaching of vocal and instrumental music and leads to certification to teach music at both elementary and secondary school levels in Maryland and many other states. There are two options. The vocal option is for students whose principal instrument is voice or piano; the instrumental option is for students whose principal instrument is an orchestral or band instrument.

All students are carefully observed at various stages of their programs by members of the Music Education faculty. This is intended to insure the maximum development and growth of each student's professional and personal competencies. Each student is assigned to an advisor who guides him or her through the various stages of advancement in the program of music and music education.

Instrumental Option

Freshman Year	Semester I	Semester II
MUSC 108, 109—Applied Music (principal instr.)	2	2
MUSC 131—Introduction to Music	3	
MUSC 150, 151—Theory of Music	3	3
MUSC 102, 103—Class Piano	2	2
ENGL 101—Composition or alternate		3
SPCH 110—Voice and Diction	3	
General University Requirements	3	6
Total	16	16
MUSC 129G—Orchestra or MUSC 129—Band	(1)	(1)

Sophomore Year		
MUSC 208, 209—Applied Music (principal instr.)	2	2
MUSC 250, 251—Advanced Theory of Music	4	4
MUSC 113, 114, 116, 117—Class Study of Instruments (3-4 courses)	2 or 4	2 or 4
ENGL 201, 202—World Literature or alternates	3	3
General University Requirements	6	3
MUED 197		1
Total	17 or 19	15 or 17
MUSC 229G—Orchestra or MUSC 229I—Band	(1)	(1)
MUSC 129—Chamber Music Ensemble (elective)	(1)	(1)

Junior Year		
MUSC 409, 409—Applied Music (principal instr.)	2	2
MUSC 330, 331—History of Music	3	3
MUSC 490, 491—Conducting	2	2
MUSC 120, 213—Class Study of Instruments (2 or 3 courses)	2	2 or 4
MUED 470—Music in Secondary Schools	4	
EDHD 300S—Human Development and Learning	6	
General University Requirements		3
Total	19	12 or 14
MUSC 329G—Orchestra or MUSC 329I—Band	(1)	(1)
MUSC 329—Chamber Music Ensemble (elective)	(1)	(1)

Senior Year		
MUSC 418—Applied Music (principal instr.)	2	
MUSC 100—Class Voice	2	
MUSC 486—Orchestration	2 or 3	
MUED 420—Band and Orchestra Techniques and Administration		2
MUED 478—Special Topics in Music Education		1
EDSE 373, EDEL 335—Student Teaching		8
EDSF 301—Foundations of Education	3	
EDSE 330—Principles and Methods of Secondary Education	2	
EDSE 489—Field Experience		1
General University Requirements	6	3
Total	17 or 18	15
MUSC 329G—Orchestra or MUSC 329I—Band	(1)	(1)
MUSC 329—Chamber Music Ensemble (elective)	(1)	

Vocal Option

Freshman Year	Semester I	Semester II
MUSC 108, 109—Applied Music (principal instr.)	2	2
MUSC 131—Introduction to Music	3	
MUSC 150, 151—Theory of Music	3	3
MUSC 100—Class Voice, MUSC 099B—Applied Music (voice), MUSC 102, 103—Class Piano	2	2
ENGL 101—Composition or alternate		3
SPCH 110—Voice and Diction	3	
General University Requirements	3	6
Total	16	16
MUSC 129A—Men's Glee Club, MUSC 129B—Women's Chorus, MUSC 129—Chamber Ensemble, or MUSC 129C—University Choir	(1)	(1)

Sophomore Year		
MUSC 208, 209—Applied Music (principal instr.)	2	2
MUSC 200, 201—Advanced Class Voice	2	2
MUSC 202, 203—Advanced Class Piano	2	2
MUSC 250, 251—Advanced Theory of Music	4	4
ENGL 201, 202—World Literature or alternates	3	3
General University Requirements	3	3
Total	16	16
MUSC 229A—Men's Glee Club, MUSC 229B—Women's Chorus, MUSC 229—Chamber Music Ensemble, or MUSC 229C—University Choir	(1)	(1)

Junior Year		
MUSC 408, 409—Applied Music (principal instr.)	2	2
MUSC 110—Class Study of String Instruments, MUSC 111—Class Study of String Instruments	2	2
MUSC 330, 331—History of Music	3	3

MUSC 490, 491—Conducting	2	2
Special Topics in Music Education		1
MUED 470—Music in Secondary Schools		4
EDHD 300S—Human Development and Learning	6	
General University Requirement		3
Total	15	17
MUSC 329A—Men's Glee Club, MUSC 329B—Women's Chorus, MUSC 329—Chamber Music Ensemble, or MUSC 329C—University Choir	(1)	(1)

Senior Year		
MUSC 410—Applied Music (principal instr.)	2	
MUED 480—The Vocal Music Teacher and School Organization	2	
MUED 472—Methods and Materials in Vocal Music for Secondary Schools		2
EDSE 330—Principles and Methods of Secondary Education	2	1
EDSF 301—Foundations of Education		3
EDEL 375, EDSE 373—Student Teaching	4	4
General University Requirements	6	6
Total	16	16
MUSC 329A—Men's Glee Club, MUSC 329B—Women's Chorus, MUSC 329—Chamber Music Ensemble, or MUSC 329C—University Choir	(1)	

Physical Education and Health Education. This curriculum is designed to prepare students for teaching physical education in elementary and secondary schools. To obtain full particulars on course requirements, the student should refer to the sections on the Department of Physical Education and the Department of Health Education.

Science Education. A science major consists of 52 semester hours study in the academic sciences.

The following courses are required for all Science Education majors: BOTN 101; CHEM 103; CHEM 104; PHYS 121-122 or 221-222; ZOOL 101; and a year of mathematics. Additional courses are selected from the academic sciences, with the approval of the student's advisor, so as to provide a minimum of 36 hours in a particular science teaching area, e.g., biology, chemistry, physics, and earth sciences, as noted below.

Preparation for biology teaching will include BOTN 202; ZOOL 102; MICB 200; genetics (ZOOL 246 or BOTN 414); human anatomy and physiology (ZOOL 201 and/or 202); a field course in both botany and zoology (BOTN 212, 462-464, or 417; ZOOL 270-271, 480 or ENTM 200); CHEM 201, 202.

Preparation for chemistry teaching will include CHEM 103, 104, 201, 202, 203, 204, 481, 482, 498 and upper division courses such as CHEM 321, 401, 403, 421, 440, 461. Math preparation should include MATH 115, 140, 141. MATH 240 and 241 or 246 are also recommended.

Preparation for physics teaching will include math through at least MATH 240, and 241 and 246 are also recommended. Physics courses will include introductory physics with calculus (PHYS 221, 222), lab courses (PHYS 285, 286), intermediate theoretical physics (PHYS 404, 405), and modern physics (PHYS 420). In addition, a physics teacher should take course work in Astronomy (ASTR 110, 180). Participation in PSSC or Harvard Project Physics courses (when offered) would be desirable.

Preparation for earth science teaching will include one year of biology (BOTN 101 and ZOOL 101), one year of chemistry (CHEM 103 and 104), one year of physics (PHYS 221, 222 preferred), MATH 115 and 140, and at least 30 hours of earth sciences with 18 hours concentration in one of the earth science fields and six hours minimum in each of two other earth science areas: GEOL 100, 102, 110, 112, 421, 422, 431, 441, 460, 489, 499; ASTR 100 and 105, 110, 180, 410, 498; GEOG 440, 445, 446, 441, 370, 372, 462.

Biology

		Semester I	Semester II
Freshman Year			
BOTN	101—General Botany	4	
ZOOL	101—General Zoology		4
MATH	110—Introduction to Mathematics I	3	
MATH	111—Introduction to Mathematics II		3
CHEM	103—College Chemistry I	4	
CHEM	104—College Chemistry II		4
SPCH	100—Public Speaking		3
General University Requirements		3	3
Total		14	17

		Semester I	Semester II
Sophomore Year			
BOTN	202—The Plant Kingdom	4	
ZOOL	102—The Animal Phyla		4
MICR	200—General Microbiology		4
CHEM	201—College Chemistry III	3	
CHEM	202—College Chemistry Laboratory III	2	
General University Requirements		6	9
Total		15	17

		Semester I	Semester II
Junior Year			
ZOOL	246 or BOTN 414—Genetics		4
ZOOL	201—Human Anatomy and Physiology	4	
PHYS	121—Fundamentals of Physics I	4	
PHYS	122—Fundamentals of Physics II		4
EDHD	300S—Human Development and Learning		6
General University Requirements		6	3
Total		14	17

		Semester I	Semester II
Senior Year			
BOTN	212 or BOTN 417 or BOTN 462-464—Field Studies	3	
ZOOL	270-271 or ZOOL 480 or ENTM 200—Field Studies	3	
Biology Elective		3	
EDSF	301—Foundations of Education	3	
EDSE	330—Principles and Methods of Secondary Education		3
EDSE	352—Curriculum, Instruction and Observation		3
EDSE	375—Student Teaching in Secondary Schools		8
Total		12	14

Chemistry

		Semester I	Semester II
Freshman Year			
BOTN	101—General Botany	4	
ZOOL	101—General Zoology		4
CHEM	103—College Chemistry I	4	
CHEM	104—College Chemistry II		4
MATH	140—Analysis I	3	
MATH	141—Analysis II		4
SPCH	100—Public Speaking		3
General University Requirements		3	3
Total		14	18

		Semester I	Semester II
Sophomore Year			
CHEM	201—College Chemistry III	3	
CHEM	202—College Chemistry Laboratory III	2	
CHEM	203—College Chemistry IV		3
CHEM	204—College Chemistry Laboratory IV		2
Mathematics or Chemistry Elective			3
General University Requirements		12	6
Total		17	14

		Semester I	Semester II
Junior Year			
CHEM	481—Physical Chemistry I	3	
CHEM	482—Physical Chemistry II		3
CHEM	498—Special Topics in Chemistry (IAC)	3	3
PHYS	221—General Physics I	5	
PHYS	222—General Physics II		5
EDHD	300S—Human Development and Learning	6	
Mathematics or Chemistry Elective			3
Total		17	14

		Semester I	Semester II
Senior Year			
Chemistry Elective		3	
EDSF	301—Foundations of Education	3	
EDSE	300—Principles and Methods of Secondary Education		3
EDSE	352—Curriculum, Instruction and Observation		3
EDSE	375—Student Teaching in Secondary Schools		8
General University Requirements		6	
Total		12	14

Earth Science

		Semester I	Semester II
Freshman Year			
BOTN	101—General Botany		4
ZOOL	101—General Zoology	4	
GEOL	100—Physical Geology	3	
GEOL	110—Physical Geology Laboratory	1	
GEOL	102—Historical Geology		3
GEOL	112—Historical Geology Laboratory		1
SPCH	100—Public Speaking		3
MATH	110—Introduction to Mathematics I	3	
MATH	111—Introduction to Mathematics II		3
General University Requirements		3	3
Total		14	17
Sophomore Year			
CHEM	103—College Chemistry I	4	
CHEM	104—College Chemistry II		4
GEOL	422—Minerology	3	
GEOL	441—Structural Geology		3
PHYS	121—Fundamentals of Physics I	4	
PHYS	122—Fundamentals of Physics II		4
General University Requirements		3	6
Total		14	17
Junior Year			
GEOG	440—Geomorphology	3	
ASTR	100—Introduction to Astronomy	3	
ASTR	105—Modern Astronomy		3
ASTR	110—Modern Astronomy Laboratory		1
EDHD	300S—Human Development and Learning		3
General University Requirements		6	6
Geology Electives		3	3
Total		15	16
Senior Year			
GEOL	460—Earth Science	3	
EDSF	301—Foundations of Education	3	
EDSE	330—Principles and Methods of Secondary Education		3
EDSE	352—Curriculum, Instruction and Observation		3
EDSE	375—Student Teaching in Secondary Schools		8
General University Requirements		3	
Earth Science Electives		4	
Total		13	14

Physics

		Semester I	Semester II
Freshman Year			
CHEM	103—College Chemistry I	4	
CHEM	104—College Chemistry II		4
MATH	140—Analysis I	4	
MATH	141—Analysis II		4
PHYS	221—General Physics I*	4	
PHYS	222—General Physics II*		4
SPCH	100—Public Speaking	3	
General University Requirements			3
Total		15	15

*The physics major sequence (181, 182, 293, 284) or the engineering sequence (161, 162, 263) may be used and appropriate course changes in the remainder of the program will be made

Sophomore Year			
PHYS	285—Intermedíate Physics Experiments I	2	
ZOOL	101—General Zoology	4	
BOTN	101—General Botany I		4
PHYS	286—Intermedíate Physics Experiments II		2
ASTR	181—Astronomy and Astrophysics	3	
MATH	240—Linear Algebra	4	
General University Requirements		3	9
Total		16	15
Junior Year			
PHYS	404—Intermedíate Theoretical Mechanics	3	
PHYS	405—Intermedíate Theoretical Electricity and Magnetism		3
PHYS	420—Modern Physics for Engineers		3
PHYS	305—Physics Shop Techniques		1
ASTR	181—Introduction to Astrophysics II	3	
EDHD	300S—Human Development and Learning		8
General University Requirements		9	3
Total		15	18
Senior Year			
PHYS	406—Optics	3	
PHYS	499—Special Problems in Physics		3
ASTR	210—Practical Astronomy	2	
General University Requirements		3	
EDSF	301—Foundations of Education	3	
EDSE	330—Principles and Methods of Secondary Education	3	
EDSE	352—Curriculum, Instruction and Observation	3	
EDSE	375—Student Teaching in Secondary Schools		8
EDSE	489C—Seminar in Science Student Teaching		1
Total		17	12

Social Studies Education

Option I (History Concentration). Requires 54 semester hours of which at least 27 must be in history, usually including HIST 221, 222, 241, 242, and 12 hours of 300 or 400 level history courses including HIST 389; 27 hours of related social sciences as outlined below:

At least one course in each of the following areas: geography, sociology (or ANTH 101), government and politics; and two courses in economics. Twelve semester hours of social science electives are required of which nine hours must be in the upper division (300-400 level). These courses may be in a given concentration such as geography, psychology, sociology, economics, anthropology, or combination of relevant fields. The selection of the courses or fields is at the discretion of the advisor as a defensible area of study. For those students with a minor in geography, GEOG 490 is required.

		Semester I	Semester II
Freshman Year			
General University Requirements		6	6
SPCH	100—Public Speaking	3	
HIST	221, 222—History of the United States to 1865; History of the United States since 1865 (or 6 hours of any U.S. History approved by advisor)	3	3
GEOG	100—Introduction to Geography	3	
GVPT	170—American Government		3
SOCY	100—Introduction to Sociology (or ANTH 101)		3
		15	15
Sophomore Year			
HIST	241, 242—Western Civilization (or 6 hours of any non-U.S. History approved by advisor)	3	3
ECON	310—Evolution of Modern Capitalism in Western Europe and the United States	3	
General University Requirements		3	3
ECON	205—Fundamentals of Economics		3
Social Science Electives		3	3
History Electives		3	3
		15	15
Junior Year			
Social Science Elective		3	
History Electives		3	3
EDHD	300S—Human Development and Learning	6	

General University Requirements	3	9
EDSE 330—Principles and Methods of Secondary Education		3
EDSE 353—Curriculum, Instruction and Observation — History*		3
	15	18
Senior Year		
EDSE 376—Student Teaching in Secondary Schools	8	
EDSF 301—Foundations of Education		3
EDSE 453—The Teaching of Reading in Secondary Schools**	3	
HIST 389—Proseminar in Historical Writing		3
Social Science Electives	3	3
Electives		6
	14	15

*EDSE 353 will be offered Spring Semester only and must be taken prior to Student Teaching
**Evening Course Only

Option II (Geography Concentration). Requires 54 semester hours of which 27 hours must be in geography. GEOG 201, 202, 203, 490, and one field experience course is required. The remaining hours in geography must be upper division systematic geography courses with one course in regional geography included. Fifteen semester hours of social science and history courses must include at least one course in sociology (or anthropology), one in government and politics, two courses in economics, and two courses in American history. Fifteen semester hours of social science and history electives are required of which nine hours must be upper division courses. These courses may be in a given concentration such as history, psychology, economics, anthropology or combination of relevant fields. The State of Maryland requires 18 hours of History courses, including 6 semester hours in U.S. History (to obtain additional certification as a social studies teacher). The selection of courses or fields is at the discretion of the advisor as a defensible area of study.

	Semester I	Semester II
Freshman Year		
General University Requirements	6	6
SPCH 100—Public Speaking	3	
GEOG 201—Physical Geography	3	
GEOG 202—Cultural Geography		3
U.S. History	3	3
SOCY or ANTH		3
	15	15
Sophomore Year		
GEOG 203—Economic Geography	3	
GEOG Field Course (GEOG 381/382/383)		1
GEOG Electives	3	6
Economics	3	3
General University Requirements	6	3
Social Science Electives		3
	15	16
Junior Year		
GEOG 490—Geography Concepts and Source Material		3
GEOG Electives	3	2
General University Requirements	6	3
EDHD 300S—Human Development and Learning	6	
EDSE 353—Curriculum, Instruction and Observation — Social Studies*		3
EDSE 330—Principles and Methods of Secondary Education		3
	15	14
Senior Year		
EDSE 376—Student Teaching in Secondary Schools	8	
EDSE 489—Field Experience	3	
EDSF 301—Foundations of Education		3
EDSE 453—Teaching of Reading in Secondary Schools**	3	
Social Science Elective		12
Elective		1
	14	16

*EDSE 353 will be offered Spring Semester only and must be taken prior to student teaching
**Evening Course Only

Speech and Drama Education. A major in speech and drama education requires 37 semester hours of speech and drama content. The program provides for designing a program of study appropriate to prospective teachers in the communication field. The 24 hour English minor is to be selected in consultation with the advisor. Students desiring a Bachelor of Arts degree must also meet departmental foreign language requirements.

Speech and Drama Education

	Semester I	Semester II
Freshman Year		
SPCH 100—Basic Principles of Speech Communication	3	
DART 110—Introduction to the Theatre	3	
DART 120—Acting		3
SPCH 110A—Voice and Diction		3
RATO 124—Mass Media in the 20th Century		3
General University Requirements	9	6
Total	15	15
Sophomore Year		
General University Requirements	3	3
SPCH 350—Foundations of Communication		3
SPCH 200—Advanced Public Speaking	3	
SPCH 220—Group Discussion		3
Major Area: Electives in Speech and Drama		6
Minor Area: English suggested	9	
Total	15	15
Junior Year		
SPCH 477—Speech Communication and the Study of Language Acquisition	3	
SPCH 489—Speech Communication Workshop		1
EDHD 300S—Human Development and Learning		6
EDSF 301—Foundations of Education	3	
Minor Area: English suggested	6	3
General University Requirements (upper level)	3	6
Total	15	16
Senior Year		
HESP 401—Survey of Speech Disorders	3	
EDSE 330—Principles and Methods of Secondary Education	3	
Minor Area: English suggested	9	
EDSE 354—Speech and Drama Methods		3
EDSE 377—Student Teaching in Speech/Drama Education Elective		8
		3
Total	15	14

Social Foundations of Education Area

Associate Professor and Chairman: Noll.
Professor: Male.
Associate Professors: Agre, Finkelstein, Hopkins, Huden, Lindsay.

The Social Foundations area in the College of Education offers courses in the history and philosophy of education and the Foundations of Education course required of all students majoring in Education (EDSF 301). These courses treat the educational enterprise as it relates to the political, social, and economic structure of society and the values which underlie a particular society. "Freedom in Education" and "Existentialism and Education" are examples of topics offered through workshops in this area. Other timely courses on such subjects as sexism, the history of childhood education, and life-long learning are offered under a special topics designation (EDSF 409). A broad perspective is sought both for classroom teachers and prospective leaders in the profession.

The area also offers the master's degree and doctorates in comparative education (the study of educational systems in other regions of the world); history of education; philosophy of education; and sociology of education.

Course Code Prefix—EDSF

Special Education

Associate Professor and Chairman: Milazzo.
Professors: Hebeler, Simms.
Associate Professor: Seidman.
Assistant Professors: Bluth, Brown, Harber, Lambour, Shroyer.

The Special Education Department offers an undergraduate program which prepares students for a teaching position in either an elementary or secondary level special education program. Students who complete the undergraduate program receive the Bachelor of Science degree and meet Maryland State Department of Education requirements for the standard professional certificate in special education and in elementary education.

Students at the undergraduate level pursue a sequential comprehensive special education program concentrating either in the area of the mentally retarded or learning disabilities. Progress through the program is dependent upon the student's achieving the requisite special teaching competencies required for graduation. Field experiences are required of all students in the department prior to their student teaching experiences.

The student consults with his advisor regarding specific details of his program, alternatives, etc. The following represents a "typical" program.

Freshman Year	Credits
General University Requirements	12
ARTE 100—Fundamentals of Art Education	3
MUSC 155—Fundamentals for the Classroom Teacher	3
SPCH 100 or 202 or 110	3
General Electives	3
Supporting Academic Content	6
Total	30

Sophomore Year	
General University Requirements	9
MATH 210, 211—Elements of Math; Elements of Geometry	8
EDSP 288—Field Placement in Special Education	1
Supporting Academic Content	9
Total	27

Junior Year	
General University Requirements (upper level)	9
EDHD 300—Human Development and Learning	6
Supporting Academic Content	3
EDEL 426—Teaching of Reading	3
EDEL 405—Language Arts in the Elementary School	3
EDEL 407—Social Studies in the Elementary School	3
EDSP 470—Introduction to Special Education	3
EDSP 471 or 491—Characteristics of Exceptional Children	3
EDSP 472 or 492—Education of Exceptional Children	3
Total	33

Senior Year	
EDEL 414—Mathematics in the Elementary School	3
EDEL 402—Science in the Elementary School	3
EDSF 301—Foundations of Education	3
EDSP 473—Curriculum for Exceptional Children	3
EDSP 489—Field Placement in Special Education	2
EDSP 349—Student Teaching of Exceptional Children	8
EDEL 334—Student Teaching in the Elementary School	8
Total	30
Total Credits	120

College of Human Ecology

The College of Human Ecology focuses in its programs on the needs of individuals and society. The College shares in the obligation of all higher education to provide a broad based education for every individual as preparation for living in close harmony with the environment in both the immediate and long-range future.

Human Ecology is an interdisciplinary, problem-focused field of study dealing with the interactions of man and his environment: how man impinges upon the environment and how the environment impinges upon man. In the broad context, the term environment includes physical-natural, socioeconomic, and esthetic concerns. Thus, Human Ecology must draw upon and integrate basic disciplines of the natural and behavioral sciences along with the arts and humanities in the definition and solving of societal problems. The several programs of the College are directed toward these problems and toward the improvement of the quality of life.

The College seeks to provide the proper balance of educational experiences which prepare an individual in the professional context with those experiences which benefit him personally as a fully functioning and contributing member of society. This balance includes grounding in basic and applied skills, as well as providing an atmosphere where creativity may flourish to enhance our potential for developing innovative solutions to societal problems.

The faculty utilizes existing knowledge and generates new knowledge, techniques and methods based on research, while providing opportunities through laboratory, practical and field experiences for making knowledge and innovative discovery more meaningful to the individual. Through these experiences the faculty experiments with varying relevant techniques and methods by which the individual can transfer to the society-at-large new ideas and methods for more effective interaction within the social and physical ecosystems in which we function.

Through teaching, research and service the College provides appropriate, comprehensive, quality education programs that prepare students for professional positions directed toward the improvement of conditions contributing to:

1. The individual's psycho-social development.
2. The quality and availability of community resources which enrich family life (in all its various forms).
3. Effective resource utilization including consumer competence.
4. The individual's physiological health and development.
5. The physical and aesthetic components of man's environment.
6. Effective use of leisure time.

In accordance with the philosophy of this College all four departments are interrelated and cooperate in the achievement of these goals. The activities of the Department of Family and Community Development emphasize mainly goals 1 through 3; the Department of Food, Nutrition and Institution Administration, 2 through 4; and with different loci and priorities, the activities of the Departments of Textiles and Consumer Economics, and Housing and Applied Design emphasize goals 2, 3, and 5. Goal 3 is concerned with consumer competence in areas such as food, clothing, shelter, transportation, insurance, health, leisure, etc. It is an integrative, interdisciplinary, educational concept which necessitates and receives contributions from all four departments. Goal 6 is becoming increasingly important with a reduced work week, earlier retirement and increases in the over-65 population, suggesting interdepartmental and interdisciplinary programs.

Objectives

1. Offer appropriate comprehensive bachelor, master and doctoral programs that address the six goals stated above.
2. Maximize resources and resource utilization in order to accomplish the six goals stated above.
3. Act as a resource to the University community to stimulate awareness and interest in the problems of applying knowledge for improving the quality of life.

Special Facilities and Activities. The College of Human Ecology building follows the Campus tradition in style, and a construction program has been initiated to provide expanded facilities. A management center is maintained on the Campus for resident experiences in management activities of family life.

Located between two large cities, the College provides unusual opportunities for both faculty and students. In addition to the University's general and specialized libraries, Baltimore and Washington furnish added library facilities. The art galleries and museums, the government bureaus and city institutions stimulate study and provide enriching experiences for students.

Student Organizations

AATT–Student Chapter. The Student Chapter of the American Association for Textile Technology provides students with an early opportunity to become associated with the professional organization of AATT, and to advance at the local level the aims and goals of the parent National Association.

Through speakers from the textiles and apparel industry, members are kept abreast of the latest techniques and ideas in textiles, as well as coming in contact with prospective future employers.

The chapter hopes to establish several intern programs to provide its members with an opportunity to gain some vocational experience before graduation.

All undergraduate students, including freshmen, are eligible to join AATT if their curriculum includes at least one major course in the field of textiles.

ASID–Student Chapter. The University of Maryland Student Chapter of the American Society of Interior Designers is associated with the professional chapter of ASID in Washington, D.C. Student members have the opportunity for contacts with professionals and fellow students at meetings sponsored by both groups. These can help to orient the student to the job market and to new directions in the profession.

Collegiate Home Economics Organization. The University of Maryland Collegiate Home Economics Organization is the student affiliate of the American Home Economics Association. Welcoming any Human Ecology major into its membership, the organization meets once a month, and links the professional world to the college student through different programs.

The Collegiate Home Economics Organization is the student's opportunity to join a professional group prior to graduation and to participate on a student level in the national association.

Each speaker or demonstrator provides the Collegiate Home Economics Organization member with ideas and suggestions for professional preparation by introducing the member to the many facets of Human Ecology.

The Organization gives both students and faculty a chance to work together and meet on an informal basis and to open up better channels of communication among themselves as well as the outside professional world.

Omicron Nu. A national honor society whose objectives are to recognize superior scholarship, to promote leadership and to stimulate an appreciation for graduate study and research in the field of home economics and related areas. Graduate students, seniors and second semester juniors are eligible for election to membership.

Student Senate. This elected, advisory group of students promotes the interests of the College of Human Ecology. Student representatives to the College Assembly, College Council and Standing Committees of the College Assembly are named from this group.

Financial Aid. A Loan Fund, composed of contributions by the District of Columbia Home Economics Association, Maryland Chapter of Omicron Nu, and personal gifts, is available through the University Office of Student Aid.

Admission. All students desiring to enroll in the College of Human Ecology must apply to the Director of Admissions of the University of Maryland at College Park.

Degrees. The degree of Bachelor of Science is conferred for the satisfactory completion, with an average of C or better, of a prescribed curriculum of 120 academic semester hour credits. No grade below C is acceptable in the departmental courses which are required for a departmental major.

Student Load. The student load in the College of Human Ecology varies from 15-18 credits per semester. A student wishing to carry more than 18 credits must have a "B" grade average and permission of the dean.

A minimum of 120 academic credits is required for graduation. However, for certification in some professional organizations, additional credits are required. Consult your advisor.

General Information. Specific inquiries concerning undergraduate or graduate programs in the College of Human Ecology may be directed to the chairman of the appropriate department or the Dean, College of Human Ecology, University of Maryland, College Park, Maryland 20742.

Curricula. A student may elect one of the following curricula, or a combination of curricula: food, nutrition, dietetics, or institution administration (food service); family, community, or management and consumer studies; home economics education; housing, advertising design, interior design, costume, or crafts; textile science, textile marketing, textiles and apparel, or consumer economics. A student who wishes to teach home economics may register in home economics education in the College of Human Ecology under the Department of Family and Community Development or in the College of Education.

Required Courses. The curricula leading to a major in the College of Human Ecology are organized into four broad professional categories: (1) scientific and technical areas, (2) educational, community and family life areas, (3) consumer service areas, and (4) design areas. These represent the broad professional fields which graduates are eligible to enter and pursue their chosen work. The positions vary in nature, scope and title, but require similar general studies background and fundamentals for specialization.

Individual programs of study are developed cooperatively with faculty advsiors to provide a balanced and sequential arrangement of studies in preparation for the chosen field. University, College and departmental requirements are identified for curricula in each of the departments.

All students in the College of Human Ecology, in addition to meeting the General University Requirements, are required to complete a series or sequence of courses to satisty University, College and departmental requirements. The remaining courses needed to complete a program of study are elected by the student with the approval of his advisor.

The final responsibility of meeting all the requirements for a specific major rests with *each* individual student.

College of Human Ecology Requirements
(For every student depending on the major)

APDS	101—Fundamentals of Design OR Human Ecology Elective*	3
TEXT	105—Textiles In Contemporary Living OR Human Ecology Elective*	3
FOOD	110—Food and Nutrition of Individuals and Families OR NUTR 100 — Elements of Nutrition OR Human Ecology Elective*	3
FMCD	250—Decision Making in Family Living OR Human Ecology Elective*	3
Root Discipline Requirements Outside the College		
SOCY or ANTH Course		3
PSYC Course		3
ECON	205—Fundamentals of Economics or 201	3
SPCH Course		3

*Human Ecology Elective to be taken in departments other than major department

Family and Community Development

Professor and Chairman: Gaylin.
Associate Professors: Brabble, Myricks, Wilson.
Assistant Professors: Churaman, Garrison, Orvedal, Rubin.
Instructors: Clay, Cohen, Surra
Lecturers: Greenwald, Waddel.

The Department of Family and Community Development integrates and applies aspects of the natural and social sciences as well as the human arts — all of which enhance man's quest for a more fully functioning life. It places particular emphasis upon the allied departments within the College of Human Ecology which in turn addresses itself to the problems of man and his immediate environment.

Specifically, Family and Community Development provides the applied human science integrationist with a firm foundation of knowledge of family and community dynamics leading to service, teaching, and research vocations. It also serves the University community by offering general courses germane to problems of living in a complex society, and stresses the concept of the family as the working interface between man, his society, and the world around him.

There are four specific though related foci within the program leading to specialized areas of endeavor within the applied human sciences.

I. *Family Studies.* This course of study stresses a working knowledge of the growth of individuals throughout the life span with particular emphasis on intergenerational aspects of family living. It examines the pluralistic family forms and life styles within our post-technological complex society and the development of the individual within the family within the community.

II. *Community Studies.* This program emphasizes the processes of social change and the individual as agent within that process. It is grounded upon the knowledge of community structure and the workings and interactions of the various subsystems. Its summary goals are the identification and utilization of community resources for the enhancement of a better life for families.

III. *Management and Consumer Studies.* This program focuses upon the use of resources of the home and its impact upon the community. It examines the integration of individual, familial and societal values of our technological society for the purposes of goal implementation within that society. It is an area of study directly concerned with quality of life and the preparing of the individual for effective consumer decisions through the understanding of the interrelationship of consumers, business, social organizations, and government.

IV. *Home Economics Education.* Although often narrowly perceived as delimited to the role of educator within a secondary school setting, Home Economics Education has a larger purview and responsibility, i.e., that of introducing and implementing through education at all levels, the theories, skills and philosophy of the attainment of a better life for all men, women and children. Thus it is the major interpreter of the ramifications and potential impact of Home Economics — the applied human sciences.

These areas of concentration will prepare students for roles as family life educators, extension specialists, consumer consultants, mental health team members, and teachers of home economics at the secondary level.

Family Studies Curriculum. Supportive courses will be selected from either Human Ecology, Sociology, Psychology, Health or Anthropology.

Typical	*Semester Hours*
Freshman Year	
ENGL 101—Composition	3
PSYC 100—Introduction to Psychology	3
FMCD 105—The Individual and the Family	3
Human Ecology Courses (outside FMCD)	9
SOCY or ANTH	3
General University Requirements	9
Total	30
Sophomore Year	
SPCH	3
ECON 201 or 205	3
FMCD 250—Decision Making in Family Living	3
FMCD 260—Interpersonal Lifestyles	3
FMCD 270—Preprofessional Seminar	3
Supportive Courses	6
General University Requirements	9
Total	30
Junior Year	
FMCD 330—Family Patterns	3
FMCD 332—The Child in the Family	3
FMCD 348—Practicum in Family and Community Development*	
or	
FMCD 446—Living Experiences with Families	3
FMCD 349—Analysis of Practicum*	2
EDHD 306, 411 or 413	6
Supportive Courses	6
General University Requirements	9
Total	32

*The 5-credit combination of practicum (FMCD 348) and practicum analysis (FMCD 349) is a mandatory requirement of the program. In consultation with the practicum coordinator, the practicum experience (FMCD 348) may be extended to 12 credits. During any semester in which the practicum is taken, a minimum of 1 credit of practicum analysis (FMCD 349) must accompany the practicum.

Senior Year	
FMCD 431—Family Crisis and Rehabilitation	3
FMCD 487—Legal Aspects of Family Problems	3
FMCD Elective	3
Supportive courses	6
Electives (to complete 120 credits)	13
Total	28

Community Studies Curriculum. Supportive courses will be chosen from the following areas: 9 credits in College of Human Ecology courses; 6 credits in government and politics, economics or urban studies courses; 6 credits in sociology or psychology courses. The following is a typical four-year program:

	Semester Hours
Freshman Year	
SOCY or ANTH	3
Human Ecology Courses (outside FMCD)	9
FMCD 201—Concepts in Community Development	3
PSYC 100—Introduction to Psychology	3
General University Requirements	12
Total	30
Sophomore Year	
ECON 201 or 205	3
FMCD 250—Decision Making in Family Living	3
SPCH	3
FOOD 200 or Elective	3
FMCD 270—Preprofessional Seminar	3
General University Requirements	3
Supportive courses	15
Total	33
Junior Year	
FMCD 330—Family Patterns	3
FMCD 341—Personal and Family Finance	3
SOCY 230—Dynamics of Social Interection	
or	
SOCY 330—Community Organization	3
FOOD 260—Meal Management	
or	
FOOD 300—Economics of Food Consumption	3
Supportive courses	3
General University Requirements	9
FMCD 348—Practicum in Family and Community Development*	3
FMCD 349—Analysis of Practicum*	2
Total	29

*The 5-credit combination of practicum (FMCD 348) and practicum analysis (FMCD 349) is a mandatory requirement of the program. In

consultation with the practicum coordinator, the practicum experience (FMCD 348) may be extended to 12 credits. During any semester in which the practicum is taken a minimum of 1 credit of practicum analysis (FMCD 349) must accompany the practicum.

Senior Year	
FMCD 370—Communications Skills and Techniques	3
FMCD 381—Low Income Families and the Community	3
FMCD 453—Family-Community Advocacy	3
Supportive courses	3
General University Requirements	6
Electives (to complete 120 credits)	10
Total	28

Management and Consumer Studies Curriculum. Supportive courses will be selected in blocks from economics, business administration, public relations, sociology, psychology, family life, or consumer economics.

Typical Freshman Year	*Semester Hours*
SOCY or ANTH	3
PSYC	3
Human Ecology Courses (outside FMCD)	9
SPCH	2-3
General University Requirements	13-14
Total	30-32

Typical Sophomore Year	
FMCD 250—Decision Making in Family Living	3
FMCD 270—Professional Seminar	3
ECON 201 and 203	6
SOCY 230—Dynamics of Social Interaction	3
FMCD 280—The Household as an Ecosystem	
or	
HSAD 241—Family Housing	3
General University Requirements	7-9
Electives	3-6
Total	28-33

Typical Junior Year	
FMCD 330—Family Patterns	3
FMCD 341—Personal and Family Finances	3
PSYC 221—Social Psychology	3
FOOD or NUTR	3
Statistics	3
FMCD 443—Consumer Problems	3
FMCD 343 or 344—Home Management Residence or Applied Management Course	3
FMCD 348—Practicum in Family and Community Development*	3
FMCD 349—Analysis of Practicum*	2
General University Requirements	3
Electives	6
Total	32-35

Typical Senior Year	
FMCD 332—The Child in the Family	3
CNEC or TXAP	3
Supportive Courses	9
Electives (to complete 120 hours)	
Total	26-35

*The 5-credit practicum is a mandatory requirement of the program (i.e., FMCD 348 for 3 credits coupled with FMCD 349 for 2 credits). In consultation with the practicum coordinator the practicum experience (FMCD 348) may be extended for a maximum of 12 credits. During any semester taken a minimum of 1 credit of analysis (FMCD 349) must accompany the experience.

Food, Nutrition and Institution Administration

Professor and Chairman: Prather.
Professors: Ahrens, Beaton, Butler, Cox, Williams.
Assistant Professor: Poplai.
Instructors: Bouwkamp, Graham, McIntyre, Smith.
Lecturer: Stewart.
Visiting Lecturers: Blyler, Miller, Naranjo.

The area of food, nutrition and institution administration is broad and offers many diverse professional opportunities. Courses introduce the student to the principles of selection, preparation and utilization of food for human health and the welfare of society. Emphasis is placed on the scientific, cultural and professional aspects of this broad area of food and nutrition. The department offers six areas of emphasis: experimental foods, community nutrition, nutrition research, dietetics, institution administration, and coordinated dietetics. Each program provides for competencies in several areas of work; however, each option is designed specifically for certain professional careers.

All areas of emphasis have in common several courses within the department and the University; the curricula are identical in the freshman year.

Experimental foods is designed to develop competency in the scientific principles of food and their reactions. Physical and biological sciences in relation to foods are emphasized. The program is planned for students who are interested in product development, quality control and technical research in foods. The nutrition research program is designed to develop competency in the area of nutrition for students who wish to emphasize physical and biological sciences. The community nutrition program emphasizes applied community nutrition. Dietetics develops an understanding and competency in food, nutrition and management as related to problems of dietary departments; the curriculum is approved by the American Dietetic Association. The coordinated dietetic program includes clinical experience coordinated with the didactic components and the students are eligible for membership in the American Dietetic Association upon graduation. Institution administration emphasis is related to the administration of quantity food service in university and college residence halls and student unions, school lunch programs in elementary and secondary schools, restaurants, coffee shops, and industrial cafeterias.

Coordinated Dietetics Emphasis

Freshman Year	*Semester* I	II
General University Requirements[1]	7	11
NUTR 100—Elements of Nutrition	3	
SOCY 100 or ANTH 102		3
MATH 110 or 115	3	
SPCH 100 or 107	3	
FOOD 105—Professional Orientation	1	
FOOD 240—Science of Food Preparation		3
Total	17	17

Sophomore Year	*Semester* I	II
CHEM 261—Introductory Biochemistry		3
FOOD 250—Science of Food Preparation	3	
ECON 205—Fundamentals of Economics		3
ZOOL 201, 202—Anatomy and Physiology	4	4
General University Requirements		3
MICB 200—General Microbiology	4	
Human Ecology Core Courses	3	3
PSYC 100	3	
Total	17	16

Junior Year	*Semester* I	II
NUTR 300—Science of Nutrition	4	
NUTR 450—Advanced Human Nutrition		3
ADM 300—Food Service Organization and Management	3	
IADM 430—Quantity Food Production	3	
IADM 460, 470—Administrative Dietetics I, II	3	3
IADM 440—Food Service Personnel Administration		2
IADM 420—Quantity Food Purchasing		3
General University Requirements		3
EDHD 460—Educational Psychology	3	
Total	16	14

Senior Year	*Semester* I	II
Human Ecology Core Requirement	3	
Data Processing or Statistics Course[3]		3

NUTR	460—Therapeutic Human Nutrition	3	
NUTR	480—Applied Diet Therapy	3	
Elective		3	4
General University Requirements		3	3
NUTR	470—Community Nutrition		3
NUTR	485—Applied Community Nutrition		3
	Total	15	16

Dietetics Emphasis

		Semester I	Semester II
Freshman Year			
General University Requirements[1]		4	8
NUTR	100—Elements of Nutrition	3	
MATH	110 or 115	3	
SPCH	100 or 107	3	
FOOD	105—Professional Orientation	1	
FOOD	240—Science of Food Preparation		3
SOCY	100 or ANTH 102		3
	Total	14	14

		Semester I	Semester II
Sophomore Year			
MICB	200—General Microbiology	4	
FOOD	250—Science of Food Preparation	3	
PSYC	100	3	
ZOOL	201, 202—Anatomy and Physiology	4	4
ECON	205—Fundamentals of Economics		3
CHEM	261—Introductory Biochemistry		3
General University Requirements			3
Human Ecology Core Course			3
	Total	14	16

		Semester I	Semester II
Junior Year			
NUTR	300—Science of Nutrition	4	
IADM	300—Food Service Organization and Management	3	
General University Requirements		3	3
Human Ecology Core Course		3	3
IADM	420—Quantity Food Purchasing		3
NUTR	450—Advanced Human Nutrition		3
Elective		3	3
	Total	16	15

		Semester I	Semester II
Senior Year			
NUTR	460—Therapeutic Human Nutrition	3	
General University Requirements		6	3
IADM	430—Quantity Food Production		3
IADM	440—Food Service Personnel Administration		2
EDHD	460—Educational Psychology	3	
Human Ecology Core Course		3	
Electives		3	5
Data Processing or Statistics Course[3]			3
	Total	18	16

Experimental Food Emphasis

		Semester I	Semester II
Freshman Year			
MATH	110 or 115	3	
NUTR	100—Elements of Nutrition	3	
General University Requirements[1]		4	4
Human Ecology Core Courses		3	3
FOOD	105—Professional Orientation	1	
SPCH	100 or 107		3
PSYC	100		3
SOCY	100 or ANTH 102		3
	Total	14	16

		Semester I	Semester II
Sophomore Year			
CHEM	201, 202—College Chemistry III	5	
FOOD	240, 250—Science of Food Preparation I, II	3	3
ECON	205—Fundamentals of Economics	3	
ZOOL	101—General Zoology	4	
CHEM	261—Introductory Biochemistry		3
MICB	200—General Microbiology		4
General University Requirements[1]			3
Human Ecology Core Course			3
	Total	15	16

		Semester I	Semester II
Junior Year			
General University Requirements		3	6
Electives[2]		5	3
NUTR	300—Science of Nutrition	4	
FOOD	440, 450—Advanced and Experimental Food Science	3	3
FDSC	412 or 413—Principles of Food Processing I, II		3
	Total	15	15

		Semester I	Semester II
Senior Year			
PHYS	111—Elements of Physics	3	
FDSC	422—Food Product Research and Development		3
FDSC	431—Food Quality Control	2	
FDSC	432—Food Quality Control Lab	2	
Electives[2]		6	3
General University Requirements		3	7
	Total	16	13

Institution Administration Emphasis

		Semester I	Semester II
Freshman Year			
MATH	110 or 115	3	
General University Requirements[1]		7	3
NUTR	100—Elements of Nutrition	3	
FOOD	105—Professional Orientation	1	
CHEM	104—Chemistry II		4
SOCY	100 or ANTH 102		3
FOOD	240—Science of Food Preparation		3
SPCH	100 or 107		3
	Total	14	16

		Semester I	Semester II
Sophomore Year			
FOOD	250—Science of Food Preparation	3	
Human Ecology Core Course		3	3
MICB	200—General Microbiology	4	
ZOOL	201, 202—Anatomy, Physiology	4	4
ECON	205—Fundamentals of Economics		3
General University Requirements			3
PSYC	100		3
	Total	14	16

		Semester I	Semester II
Junior Year			
General University Requirements		3	6
NUTR	300—Science of Nutrition	4	
IADM	300—Food Service Organization and Management	3	
Human Ecology Core Course		3	
EDHD	460—Educational Psychology	3	
Data Processing or Statistics			3
IADM	420—Quantity Food Purchasing		3
Electives			3
	Total	16	15

		Semester I	Semester II
Senior Year			
IADM	430—Quantity Food Production		3
IADM	440—Food Service Personnel Administration		2
IADM	450—Food Service Equipment and Planning	2	
BMGT	362 or ECON 470—Business Law or Labor Economics	3	
IADM	350 or 490—Special Problems or Practicum in Administration	3	
General University Requirements		3	5
Electives		3	5
	Total	14	15

Community Nutrition Emphasis

		Semester I	Semester II
Freshman Year			
General University Requirements[1]		8	7
MATH	110 or 115	3	
NUTR	100—Elements of Nutrition	3	
FOOD	105—Professional Orientation	1	
Human Ecology Core Course			3
FOOD	240—Science of Food Preparation		3
SPCH	100 or 107		3
	Total	15	16

		Semester I	Semester II
Sophomore Year			
CHEM	201, 202—Chemistry III	5	
PSYC	100	3	
FOOD	250—Science of Food Preparation	3	

ZOOL	201, 202—Anatomy & Physiology	4	4
General University Requirements			6
FOOD	260—Meal Management		3
CHEM	261—Introductory Biochemistry		3
	Total	15	16

		Semester I	Semester II
Junior Year			
NUTR	300—Science of Nutrition	4	
SOCY	100 or ANTH 102	3	
MICB	200—General Microbiology	4	
NUTR	450—Advanced Nutrition		3
Human Ecology Core Course		3	3
General University Requirements			3
ECON	205—Fundamentals of Economics		3
Elective			3
	Total	14	15

		Semester I	Semester II
Senior Year			
NUTR	460—Therapeutic Human Nutrition	3	
NUTR	470—Community Nutrition		3
EDHD	460—Educational Psychology	3	
Methods of Teaching Course			3
General University Requirements		3	3
Electives		6	5
	Total	15	14

Nutrition Research Emphasis

		Semester I	Semester II
Freshman Year			
General University Requirements[1]		8	10
MATH	110 or 115	3	
NUTR	100—Elements of Nutrition	3	
FOOD	105—Professional Orientation	1	
SPCH	100 or 107		3
FOOD	240—Science of Food Preparation		3
	Total	15	16

		Semester I	Semester II
Sophomore Year			
CHEM	203, 204—Chemistry IV	5	
PSYC	100	3	
FOOD	250—Science of Food Preparation	3	
ZOOL	201, 202—Anatomy and Physiology	4	4
General University Requirements			3
Human Ecology Core Course			3
MICB	200—General Microbiology		4
SOCY	100 or ANTH 102		3
	Total	15	17

		Semester I	Semester II
Junior Year			
General University Requirements		3	3
Human Ecology Core Course		3	3
CHEM	461, 462—Biochemistry	3	3
CHEM	463, 464—Biochemistry Lab	2	2
NUTR	300—Science of Nutrition	4	
NUTR	450—Advanced Human Nutrition		3
	Total	15	14

		Semester I	Semester II
Senior Year			
AGRI	401—Agricultural Biometrics	3	
NUTR	490—Social Problems in Nutrition		3
ECON	205—Fundamentals of Economics	3	
General University Requirements			3
Electives		8	8
	Total	14	14

[1]General University Requirements include 30 hours. Majors must be careful to select prerequisites for major courses. For example, if FOOD 240 is required, the student must select CHEM 103 and 104 and these can be used to meet the General University Requirements. If ZOOL 201 is required, ZOOL 101 must be elected

[2]Nine hours of the 17 electives must be selected from the following list
AGRI 401—Agricultural Biometrics (3)
Any 300 or 400 level NUTR course
FOOD 260—Meal Management (3)
FOOD 300—Economics of Food Consumption (3)
FOOD 445—Advanced Food Science Lab (1)
FOOD 480—Food Additives (3)
FOOD 490—Special Problems in Foods (2-3)
FDSC 430—Food Microbiology (3)
FDSC 412 or 413 if not taken above
IADM 430—Quantity Food Production (3)
FMCD 370—Communications Skills and Techniques in Home Economics (3)

[3]Select from this list AGRI 301, 401, BMGT 301, IFSM 401, CMSC 103, 110, EDMS 451

Home Economics Education

The Home Economics Education curriculum is designed for students who are preparing to teach home economics in the secondary schools. It includes study of each area of home economics and the supporting disciplines.

Fifteen hours of the total curriculum include an area of concentration which must be unified in content and will be chosen by the student.*

		Semester I	Semester II
Freshman Year			
FMCD	250—Decision Making in Family Living	3	
FMCD	105—The Individual in the Family	3	
FOOD	110—Food and Nutrition of Individuals		
	or		
NUTR	100—Elements of Nutrition	3	
EDSE	151—Freshman Seminar in Home Economics Education	1	
TEXT	105—Textiles in Contemporary Living	3	
General University Requirements		3	6
APDS	101—Fundamentals of Design		3
PSYC	100—Introduction to Psychology		3
SOCY	100—Introduction to Sociology		3
	Total	16	15

		Semester I	Semester II
Sophomore Year			
SPCH	100—Basic Principles of Speech Communication	3	
TEXT	221—Apparel I (if exempted, may take TEXT 222 or TEXT 425)	3	
CHEM	103—College Chemistry I	4	
General University Requirements		6	6
HSAD	240—Design and Furnishings in the Home		
	or		
HSAD	241—Family Housing		3
EDSE	210—Sophomore Seminar in Home Economics Education		1
FOOD	200—Scientific Principles of Food		3
FMCD	332—The Child in the Family		
	or		
EDHD	411—Child Growth and Development		3
	Total	16	16

		Semester I	Semester II
Junior Year			
EDHD	300S—Human Development and Learning	6	
FMCD	280—The Household as an Ecosystem		
	or		
FMCD	443—Consumer Problems		
	or		
FMCD	341—Personal and Family Finance	3	
FOOD	260—Meal Management	3	
ECON	205—Fundamentals of Economics	3	
FMCD	344—Resident Experience in Home Management		
	or		
FMCD	344B—Practicum in Home Management	3	
EDSE	380—Field Experience in Organization and Administration of a Child Development Laboratory		1
EDSE	425—Curriculum Development in Home Economics		3
Area of Concentration			6
General University Requirements			9
	Total	18	19

		Semester I	Semester II
Senior Year			
EDSE	347—Curriculum, Instruction, and Observation	3	
EDSE	330—Principles and Methods of Secondary Education	2-3	
EDSE	370—Student Teaching in Secondary Schools — Home Economics	8	
FMCD	260—Interpersonal Lifestyles		
	or		
SOCY	443—The Family and Society		3
EDSF	301—Foundations of Education		3
ZOOL	101—General Zoology		
	or		
MICB	200—General Microbiology		4
Area of Concentration			9
	Total	14	19

*Area of Concentration 15 semester hours

A) Including maximum of two home economics courses or in applied area, with the remainder of the 15 hours in supporting behavioral, physical and biological sciences, philosophy, geography and history
B) Of the 15 hours, nine must be upper divisional courses

Course Code Prefixes—FMCD, HOEC

Housing and Applied Design

Professor and Chairman: Shearer.
Associate Professor: McWhinnie.
Assistant Professors: Fish, Holvey, Nelson, Ritzmann, Roper.
Instructors: Dean, Erdahl, Hillerman, Irby, Odland.
Lecturers: Davis, Ribalta.

The Department of Housing and Applied Design offers programs of concentration in five areas of design: Advertising; Costume; Crafts; Housing; Interior.

The goal is that of providing a broad general education in addition to individually and professionally oriented instruction in design. Programs include instruction in the philosophy and methods common to the various areas of design and thus provide theoretical and technical bases pertinent to each. This foundation is basic to specific problem-solving activities which are applicable to the demands of each chosen design area.

Advertising Design. The Advertising Design curriculum is constructed to establish a foundation in the field of graphic communication. Courses are structured and arranged to provide students with the ability to conceptualize imaginatively and to acquire and apply a discriminating introspection for visual form. Courses in Art History and related areas provide breadth as well as depth. Opportunities to examine related fields are offered through elective courses. Students graduating from this curriculum gain a broad educational experience which qualifies them to initiate a career in many areas of graphic communications.

Costume Curriculum. The Costume curriculum is structured to prepare students for employment in the many-faceted fashion industry. Advanced courses encourage interviews and on-the-job contacts with working professionals. By careful selection of elective courses and the allied-area block the program may be tailored to the student's goals. Graduates completing this major may choose careers in: fashion design, illustration, display and sales promotion, fashion reporting and public relations, fashion coordination, and photography.

Crafts Design. The Crafts curriculum provides the student with a wide range of art and design experience. After exposure to studio work in several craft media, the student should become proficient in at least one area. Opportunities for employment include: teaching in recreational and adult education programs, directing various forms of craft programs for the government, and as a producing craftsman.

Housing Curriculum. This program is concerned with the exploration of factors which underlie housing problems, the extent of these problems as they exist today, and a projection to future trends and needs. Through integration of relevant research from sociology, economics, architecture, psychology and design, the program provides a transdisciplinary framework within which is developed an understanding of social and behavioral implications of housing processes and of effective design.

Interior Design. This curriculum, successfully completed, provides the student with background in design theory; in history of architecture, interiors and furnishings; in functional and imaginative problem solving; and in techniques of presentation. A student organization and internships provide meaningful contact with practicing professionals.

Advertising Design Curriculum

	Semester Hours
Typical Freshman Year	
APDS 101A	3
ARTS 110B	3
SPEECH Course	3
General University Requirement	9
APDS 102	3
EDIN 101A	2
HUMAN ECOLOGY Core	3
SOCY or ANTH Course	3
	29
Typical Sophomore Year	
APDS 103	3
PSYC 100	3
General University Requirement	6
HUMAN ECOLOGY Core	6
APDS 210	3
APDS 237	2
APDS 211	3
APDS 230	3
EDIN 134	3
	32
Typical Junior Year	
General University Requirement	9
ECON 205	3
APDS 320	3
APDS 330	3
ARTH 450 or other upper level Art Hist	3
APDS 331	3
APDS 332	3
Supporting-Block Course	3
	30
Typical Senior Year	
APDS 430	3
APDS 337	2
Supporting-Block Course	6
Elective	7
APDS 380	2
APDS 431	3
General University Requirement	6
	29

Costume Curriculum

Typical Freshman Year	
APDS 101	3
ARTS 110B	3
General University Requirement	12
HUMAN ECOLOGY Core	3
APDS 102	3
APDS 210	3
SOCY or ANTH Course	3
	30
Typical Sophomore Year	
APDS 103	3
APDS 211	3
SPEECH Course	3
General University Requirement	9
APDS 220	3
HUMAN ECOLOGY Core	3
APDS 330 or substitution	3
Elective	3
	30
Typical Junior Year	
APDS 320	3
APDS 237	2
PSYC 100	3
Supporting-Block Course	3
General University Requirement	6
APDS 331 or substitution	3
APDS 321	3
HUMAN ECOLOGY Core	3
ECON 205	3
Supporting Course	3
	32
Typical Senior Year	
APDS 322	4
APDS 332	3
Supporting-Block Course	3
General University Requirement	3

Elective	13
APDS 380	2
	28

Crafts Curriculum

Typical Freshman Year

APDS 101A	3
HUMAN ECOLOGY Core	6
General University Requirement	9
PSYC 100	3
APDS 102	3
SOCY or ANTH Course	3
APDS 210	3
	30

Typical Sophomore Year

APDS 103	3
EDIN 102	3
General University Requirement	9
Elective	3
APDS 211	3
CRAF 240	3
SPEECH Course	3
HUMAN ECOLOGY Core	3
	30

Typical Junior Year

CRAF 220	3
CRAF 241	3
APDS 230	3
General University Requirement	6
Supporting-Block Course	3
CRAF 230	3
CRAF 320	3
APDS 237	2
ECON 205	3
Elective	2
	31

Typical Senior Year

CRAF 330	3
CRAF 420	3
CRAF 428 or 438 or 448	3
General University Requirement	6
Supporting-Block Course	6
APDS 380 (CRAF Section)	2
CRAF 428 or 438 or 448	3
CRAFTS Elective	3
	29

Housing Curriculum

Typical Freshman Year

APDS 101A	3
SPEECH Course	3
HUMAN ECOLOGY Core	3
SOCY or ANTH Course	3
General University Requirement	6
APDS 102	3
APDS 210	3
TEXT 150	3
PSYC 100	3
	30

Typical Sophomore Year

APDS 103	3
HSAD 240	3
HUMAN ECOLOGY Core	6
HSAD 246	3
General University Requirement	9
HSAD 241	3
PSYC 221	3
	30

Typical Junior Year

HSAD 342	3
FMCD 260 or substitution	3
General University Requirement	9
TEXT 221 or TEXT 355	3
HSAD 343	3
SOCY 230	3
Supporting-Block Course	3
Elective	3
	30

Typical Senior Year

FMCD 330	3
ECON 205	3
General University Requirement	6
Supporting-Block Course	6
Elective	6
FMCD 332	3
HSAD 442	3
	30

Interior Design Curriculum

(Interior Design courses must be taken in sequence.)

Typical Freshman Year

APDS 101A	3
General University Requirement	9
EDIN 101A	2
HUMAN ECOLOGY Core	3
SOCY or ANTH Course	3
APDS 102	3
HUMAN ECOLOGY Core (TEXT 150)	3
APDS 210	3
	29

Typical Sophomore Year

APDS 103	3
SPEECH Course	3
APDS 237	2
HSAD 246	3
General University Requirement	12
ECON 205	3
PSYC 100	3
Supporting-Block Course	3
	32

Typical Junior Year

HUMAN ECOLOGY Core (TEXT 463)	3
HSAD 340	3
HSAD 342	3
General University Requirement	6
Supporting-Block Course	3
HSAD 341	3
HSAD 343	3
Elective	3
ARTH Elective	3
	30

Typical Senior Year

HSAD 344	3
Elective	9-10
Supporting-Block Course	3
General University Requirement	3
HSAD 345 or 380	3 or 2
HSAD 440	4
HSAD 441	4
	29

Course Code Prefixes—APDS, CRAF, HSAD

Textiles and Consumer Economics

Chairman and Professor: Smith.
Professor: Dardis.
Associate Professors: Buck, Spivak.
Assistant Professors: Block, Hacklander, Heagney, Wilbur (Emeritus).
Instructors: Marro, Richards.
Visiting Professors: Clark, Winger, Yeh.
Lecturers: Bunting (p.t.), Ruth (p.t.), Shapiro (p.t.).

Students may select one of four majors. Each offers diverse professional opportunities. Through supportive courses students add to their major studies a concentration of work in an allied area such as art, business, economics, family services, journalism, sciences, or speech and dramatic art.

In the *Textile Science* major emphasis is placed on the scientific and technological aspects of the field. Graduates will be qualified for employment in many facets of the textile industry including research and testing laboratories, consumer technical service and marketing programs, and in buying and product evaluation.

There are three areas of concentration in the *Textiles and Apparel* major — Apparel Design, Fashion Merchandising, and Consumer Textiles. Graduates in the first two areas may work as apparel designers,

fashion coordinators, consultants to the home sewing industry and retail store buyers. The Consumer Textiles area is designed to prepare students for careers in publicity, promotion, consumer information and extension.

Graduates of the *Textile Marketing* major will be qualified for careers in business where they will function as communicators between the textile producer and consumer in merchandising and fashion promotion, in consumer education programs and in textile production, promotion and development.

Graduates completing the major in *Consumer Economics* will be able to provide liaison between the consumer and producers and distributors of goods and services utilized directly by families and may work in consumer education programs, in marketing and consumer relation divisions in business and industry, or in government agencies providing consumer services.

A department Honors Program permits outstanding undergraduates to explore in depth on an individual basis a program of work which will strengthen their undergraduate program and their professional interests. Students selected for the program must have a "B" average or better to be considered. Students in the honors program participate in a junior honors seminar and present a senior thesis.

Freshman Year (Common to all Majors)

English Requirement	3	3
MATH 110 or 115	3	
SOCY 100	3	
SPCH 100, 107 or 125		3
HUMAN ECOLOGY Core Course		3
Textiles in Contemporary Living—TEXT 105 (CNEC 100 for CNEC majors)	3	
Physical Science (CHEM 103, 104, or 105, 106)	4	4
PSYC 100		3
	16	16

Textiles and Apparel

	Semester I	Semester II
Sophomore Year		
General University Requirements	3	3
Economics 201 and 203	3	3
HUMAN ECOLOGY Core Course (APDS 101)	3	
Apparel I & II TEXT 221 & 222	3	3
Introduction to Textile Materials—TEXT 150	3	
Textile Materials: Evaluation and Characterization TEXT 250		3
Elective		3
	15	15

Junior Year	
HUMAN ECOLOGY Core Course	3
Textile Science: Chemical Structure and Properties of Fibers—TEXT 452 or Environmental Textiles—TEXT 355	3
General University Requirements	12
Marketing BMGT 350	3
Depart. Elective	6
Electives	6
	33

Senior Year	
TEXT 441—Clothing and Human Behavior or CNEC 437—Consumer Behavior	3
TEXT 465—Economics of the Textile and Apparel Industries or CNEC 435—Economics of Consumption	3
General University Requirements	12
Dept. Elective	6
Electives	4
	28

Textile Marketing

	Semester I	Semester II
Sophomore Year		
General University Requirements	3	3
Economics 201 and 203	3	3
HUMAN ECOLOGY Core Course (APDS 101)	3	
TEXT 221 and 222 or Department Electives	3	3
Introduction to Textile Materials TEXT 150	3	
Textile Materials Evaluation and Characterization TEXT 250		3
Elective		3
	15	15

Junior Year	
HUMAN ECOLOGY Core Course	3
Environmental Textiles TEXT 355	3
BSAD 230	3
General University Requirements	12
Marketing BSAD 350	3
BSAD Requirement*	3
Electives	3
	30

Senior Year	
Clothing and Human Behavior TEXT 441 or Consumer Behavior CNEC 437	3
Textile Science: Chemical Structure and Properties of Fibers TEXT 452	3
Economics of the Textile and Apparel Industries TEXT 465	3
General University Requirements	12
BSAD Requirement*	3
Electives	4
	28

*Selected from BSAD 351, 352, 353, 360, 450 and 452

Textile Science

	Semester I	Semester II
Sophomore Year		
General University Requirements	3	3
HUMAN ECOLOGY Core Course		3
Introduction to Textiles TEXT 150	3	
Textile Materials: Evaluation and Characterization TEXT 250		3
Chemistry 201, 202, 203, 204 or 211, 212, 213, 214	5	5
Math 140, 141 or 110, 111	3-4	3-4
	14-15	17-18

Junior Year	
Physics 141, 142 or 121, 122	8
Textile Science: Chemical Structure and Properties of Fibers TEXT 452	3
HUMAN ECOLOGY Core Course	3
Statistics	3
Economics 201 and 203	6
General University Requirements	9
	32

Senior Year	
Textile Science: Finishes TEXT 454 or Textile Science: Chemistry and Physics of Fibers and Polymers TEXT 456	3
Economics of the Textile and Apparel Industries TEXT 465 or Economics of Consumption CNEC 435	3
General University Requirements	15
Electives	7
	28

Consumer Economics

	Semester I	Semester II
Sophomore Year		
General University Requirements	3	3
Economics 201 and 203	3	3
HUMAN ECOLOGY Core Course (FOOD 110 or NUTR 100)	3	
Introduction to Textile Materials TEXT 150		3
HUMAN ECOLOGY Core Course (HSAD 241)	3	
Math (111, 220, or 140) or Statistics	3-4	
Consumer Product Information		3
Math (221 or 141) or Elective		3-4
	15-16	15-16

Junior Year

Economics of Consumption CNEC 435	3
General University Requirements	12
Consumer Product Information	6
Statistics	3
Economics 401 and 403	6
	30

Senior Year

Consumer Behevior CNEC 437	3
The Consumer and the Law CNEC 431	3
General University Requirements	12
Marketing BMGT 350	3
Electives	7
	28

Course Code Prefixes—TEXT, CNEC

College of Library and Information Services

The College of Library and Information Services is a graduate program which draws its students from many undergraduate disciplines. Although many of the College of Library and Information Services students have degrees in the social sciences and humanities, there is an increasing interest in people with diverse backgrounds — in the sciences, for example. The continued influence of scientific advances, the variations in clientele and service patterns, and the constantly shifting character of the societal scene are among the factors which have significantly influenced and will doubtless influence all the more in the future the scope and character of library functions and responsibilities. The library and information professional in the 1970's must have competence in many disciplines if he or she is to serve well in the information centers, urban areas, public libraries, and school libraries. The College of Library and Information Services is a visionary school, attempting to produce people to fill contemporary needs.

The library science education program at the undergraduate level fulfills the State of Maryland's requirements for the Educational Media Associate Certificate, Level I. Its graduates are prepared to work in school media centers under the guidance of the Educational Media Generalist, Level II, which is normally achieved with completion of the master's in library service degree.

Because of the universal application of many principles of librarianship and media, students other than education students interested in library and media courses may register for the undergraduate library science courses without being enrolled in the certification program.

While the undergraduate program in library science education fulfills a great need in training school library and media personnel and persons to fill special roles, the master's degree program in the College of Library and Information Services is the recognized avenue for preparing fully qualified professionals in the library field.

For information regarding the undergraduate library science education program, refer to the Index listing for: "Departments, Programs and Curricula, Library Science Education."

College of Physical Education, Recreation and Health

The College of Physical Education, Recreation and Health provides preparation leading to the Bachelor of Science degree in the following professional areas: physical education (three certification options), health education and recreation. The College also offers curricula in safety education, and kinesiological sciences. The College provides a research laboratory for faculty members and students who are interested in investigating the effects of exercise and various physical education activities upon the body, as well as determining methods and techniques of teaching various sports.

The service section of each department offers a wide variety of courses for all University students. These courses may not only be used to fulfill the General University Requirements, but may also be used as electives.

In addition to its various on-campus offerings, this College regularly conducts courses in physical education, health education and recreation in various parts of the State of Maryland and conducts workshops wherever requested by proper officials.

To encourage research, the College maintains laboratories for students and faculty for the purpose of conducting special research projects in areas related to the disciplines of the three departments.

Programs combining research, service and instruction are provided by the Children's Health and Development Clinic, the Adults' Health and Developmental Program, and the Sports Medicine and Physical Fitness Center.

Indoor Facilities. Six separate buildings support the academic programs of the College plus the Intramural Sports Program for men and the WRA Program for women.

Five separate buildings are used for the Intramural Sports Program for men, the WRA Program for women, the Professional Physical Education Program, the Health Education Program, and the Recreation Program.

Cole Student Activities Building. This building houses the offices of the College of Physical Education, Recreation and Health and the Department of Intercollegiate Activities. It contains six activity teaching stations: the main arena, the swimming pool, the small gym, the weight training room, the wrestling room, and the judo room. In addition, there are ten classrooms, a research laboratory, a safety and driver education center, and a conference room.

The main arena of this building has 19,796 sq. ft. of floor space. This arena provides facilities for class work in basketball, volleyball, and fencing.

The swimming pool is divided into two areas by a permanent bulkhead. The shallow end is 42 x 24 feet and the large area is 42 x 75 feet with a depth ranging from 4 to 13 feet.

The small gymnasium is used for gymnastics, including tumbling, trampolining and all types of apparatus work. The total floor space is 9,462 sq. ft.

The weight-training classroom is equipped with sufficient weights for 11 stations of three persons each.

There is a wrestling room containing 8,056 sq. ft.

Preinkert Field House. Preinkert Field House contains offices for faculty in physical education and health education. There is a regulation size swimming pool, 75 x 35 feet, equipped with two one-meter diving boards. In the gymnasium, 90 x 50 feet, classes are held in badminton, volleyball, and basketball. An adjacent classroom is used for professional courses. The dance studio, used for dance and fundamentals of movement classes, is 40 x 60 feet.

In addition to the above areas, there are locker and shower rooms used by women enrolled in physical education and those participating in recreational activities, and a small lounge for major students.

Armory. The Armory is used primarily for the intramural program. It houses the offices of the director of intramurals and an athletic equipment room from which students may secure equipment for recreational purposes. The 28,880 sq. ft. of floor space has four basketball courts, with badminton and volleyball courts superimposed on them. This facility is also used as an indoor track, with indoor vaulting, high and broad jump pits, a one-tenth mile track, and a 70 yard straightaway.

Coliseum. The Coliseum is used as a supplementary facility for intramurals and physical education classes for men and women. Included in the facilities are an equipment issue room, shower and locker rooms for men and women, a classroom, an adapted physical education laboratory, and office space for physical education staff.

The 6,555 square feet of floor space is used primarily for co-educational classes in square and social dance and as an intramural basketball court.

New PERH Building. The first phase of a projected three-phase, multimillion dollar facility has been

completed on the north campus near the Cambridge dorm complex. This initial building has two regulation basketball courts, ten badminton courts, three volleyball courts, eight handball courts, men's and women's locker rooms and the first portion of the research laboratory. It includes some 40,000 square feet.

Health Education Department/East Education Annex. This building provides offices for the department chairman and faculty and graduate assistants of Health Education.

Outdoor Facilities. *The Stadium.* The stadium, with a seating capacity of 33,536 has a one-quarter mile tartan track with a 220-yard straightaway. Pits are available for pole vaulting and high and broad jumping. West of the stadium are facilities for the shot put, discus and javelin throw. The College of Physical Education, Recreation and Health uses these facilities for classes in track and field. Also east of the stadium are three practice football fields, the baseball stadium, and a practice baseball, lacrosse, and soccer field. The College uses some of these facilities for major skill classes in football, soccer, and baseball. West of the stadium are four combination soccer-touch football play fields, complete with goal posts, and four softball fields with wire backstops for physical education classes and recreational use.

Surrounding the Armory are four touch football fields and eight softball fields, encompassing 18.4 acres. These fields, and the four in the Fraternity Row are used for intramurals.

Immediately west of the Cole Activities Building are 14 all-weather tennis courts. A modern 18-hole golf course was opened in 1957. This 204-acre course includes two lakes, and an additional 5.8-acre golf driving range for instructional purposes. The golf driving range, equipped with lights, and the golf course greatly add to present recreational facilities.

The outdoor facilities of the new PERH Building include eight lighted tennis courts and an outdoor playing field 300 feet by 600 feet for touch football, soccer, and lacrosse.

The outdoor facilities adjacent to the Preinkert Field House include four hard-surfaced tennis courts, and a combination hockey and lacrosse field.

General Information — Entrance Requirements. All students desiring to enroll in the College of Physical Education, Recreation and Health must apply to the Director of Admissions of the University of Maryland at College Park.

Sixteen units of high school credits are required for admittance to this College. Recommended courses are: four units of English, one unit of social science, one unit of natural science, two units in mathematics, and one unit of physical sciences.

Guidance. At the time of matriculation and first registration, each student is assigned to a member of the faculty of the College who acts as the student's academic advisor. This faculty member will be in physical education, recreation or health education, depending on the student's choice of curriculum. The student should confer regularly with his advisor prior to each registration.

Normal Load. The normal University load for students is 12-21 credit hours per semester. No student may register for more than 19 hours unless he or she has a "B" average for the preceding semester and approval of the dean of the College.

Electives. Electives should be planned carefully, and well in advance, preferably with the student's academic advisor. It is important to begin certain sequences as soon as possible to prevent later conflict. Electives may be selected from any department of the University in accordance with a student's professional needs.

Freshman and Sophomore Program. The work of the first two years in this College is designed to accomplish the following purposes: (1) provide a general basic or core education and prepare for later specialization by giving a foundation in certain basic sciences; (2) develop competency in those basic techniques necessary for successful participation in the professional courses of the last two years.

The technique courses will vary considerably in the different curriculums and must be satisfactorily completed, or competencies demonstrated before the student can be accepted for the advanced courses in methods and in student teaching. It is very important that each requirement be met as it occurs.

Student Teaching. Opportunity is provided for student teaching experience in physical education and health education. The student devotes one semester in the senior year to observation, participation, and teaching under a qualified supervising teacher in an approved Teacher Education Center. A University supervisor from the College of Physical Education, Recreation and Health visits the student periodically and confers with the student teacher, the cooperating teacher, and the center coordinator, giving assistance when needed.

To be eligible for student teaching, the student must: (1) *have the recommendation of the University supervising teacher, and* (2) *must have fulfilled all required courses for the B.S. degree except those in the Block Student Teaching Semester, excluding those exceptions approved by each department.* The student must obtain a grade of C or better in all professional courses in his or her curriculum and must register for all courses in the "Block" concurrently.

Field Work. Recreation major students are expected to carry out a number of field experiences during their University career: volunteer or part-time recreation employment during the school year, summer employment in camps or at playgrounds, etc. These experiences culminate in a senior semester of field work for which a student receives credit and during which the student works as a staff member (for 20 hours per week) in the field of recreation in which he or she hopes to be employed, such as public recreation, recreation for the exceptional, agencies (Y's, scouts, etc.), military recreation, etc.

Degrees. The degree of Bachelor of Science is conferred upon students who have met the conditions of their curricula as herein prescribed by the College of Physical Education, Recreation and Health.

Each candidate for a degree must file a formal application with the Registrations Office during the registration period, or not later than the end of the third week of classes of the regular semester, or at the end of the second week of the summer session, prior to the date of graduation.

Certification. The Maryland State Department of Education certifies for teaching only when an applicant has a tentative appointment to teach in a Maryland county school. No certificate may be secured by application of the student on graduation. Course content requirements for certification are indicated with each curriculum. A student intending to qualify as a teacher in Baltimore, Washington or other specific situations should secure a statement of certification requirements before starting work in the junior year and discuss them with his or her academic advisor.

Student Organizations and Activities

Majors' Club. All students enrolled in the College are eligible for membership in this organization. It conducts various professional meetings, brings in speakers and promotes various corecreational activities. It has sponsored trips to district and national conventions of the American Association for Health, Physical Education and Recreation, and is chartered as a student major club of that organization.

Aqualiners. This synchronized swimming club is open to all men and women registered in the University. Through weekly meetings the group concentrates on additional stroke perfection, individual and group stunts,

diving, and experimentation with various types of accompaniment and choreographic techniques. An original water show is presented each spring and several demonstrations are given each year. Tryouts are held twice a year — once at the beginning of the fall semester, and again after the water show during the spring semester.

University of Maryland Recreation and Parks Society. In the fall of 1959 the University of Maryland Recreation and Parks Society was formed by the undergraduate and graduate major and minor students of the College. The society, an affiliate of the State and national recreation organizations, provides opportunities for University and community service, for rich practical experience, and for social experiences for those students having a mutual professional recreation interest.

Gymkana Troupe. The Gymkana Troupe includes men and women students from all Colleges who wish to express themselves through the medium of gymnastics. These individuals coordinate their talents in order to produce an exhibitional performance that has been seen in many places including Bermuda, Iceland, the Azores, Idaho, Montana, and the eastern seaboard of the United States. The organization has three principal objectives: (1) to provide healthful, co-recreational activities that provide fun for the students during their leisure hours; (2) to promote gymnastics in this locality; and (3) to entertain our students and people in other communities.

This organization is co-sponsored by the Physical Education Department and the Student Government Association, and it welcomes any student, regardless of the amount of experience, to join.

Intramural Sports For Men. The Intramural Sports Department offers organized competition in 20 sports activities: touch football, soccer, golf, horseshoes, tennis, cross country and handball in the fall; basketball, bowling, weightlifting, swimming, wrestling and chess during the winter; and badminton, table tennis, volleyball, foul shooting, racquetball, softball and outdoor track in the spring.

In these sports, competition is conducted as single elimination, best performance, or round robin tournaments for five separate classifications — open (commuters, etc.), dormitory residents, fraternity members/pledges, graduate students and faculty/staff members. The Intramural Sports Director meets regularly with an Advisory Council composed of a representative from each of these categories.

Indoor facilities such as Reckord Armory and Ritchie Coliseum are also made available in the evenings and on the weekends for recreational use.

Many good paying employment opportunities exist in the program as positions such as referees, tournament directors, field liners, publicists and photographers are always available.

Call 454-5454, a 24-hour recording, for information concerning tournament entry dates, game results, hours for recreational facilities, inclement weather postponements or last minute changes.

The Intramural Sports Office is located in No. 1104 Reckord Armory. Pick up your copy of the *Intramural Sports Handbook*.

Women's Recreation Association. All undergraduate women students of the University are automatically members of the Women's Recreation Association. Under the leadership of its student officers, and representatives and sports managers, the WRA sponsors a program of intramural, extramural and interest group activities. These activities seek to develop new interests and skills for leisure-time enjoyment, provide opportunities for continuing both old and new interests, and provide a democratic atmosphere for educational leadership experiences. Included are free and tournament play in tennis, badminton, basketball, bowling, fencing, field hockey, golf, softball, swimming, table tennis, and volleyball. Co-recreational activities include bowling, badminton and volleyball. Intramural tournaments are organized through the dormitory, sorority, and day commuter groups of the University. Opportunities are also provided for officiating experience.

Various special groups and clubs interested in recreation exist on campus outside the Women's Recreation Association program. Some of these are the Terrapin Trail Club, Chess Club, Sailing Club, Ski Club, and musical and dramatic groups.

Unstructured Recreational Activities. Free play activities such as tennis, swimming, handball, racquetball, and basketball have become very popular with students, faculty and staff on the College Park Campus. The College of Physical Education, Recreation and Health encourages these activities by scheduling as many of its facilities available as possible for students who wish to participate on an informal basis.

Phi Alpha Epsilon. Honorary Society of the College of Physical Education, Recreation and Health.

The purpose of this organization is to recognize academic achievement and to promote professional growth by sponsoring activities in the fields of physical education, recreation, health and related areas.

Students shall qualify for membership at such time as they shall have attained junior standing in physical education, health or recreation, and have a minimum overall average of 2.7 and a minimum professional average of 3.1. Graduate students are invited to join after 10 hours of work with a 3.3 average. The organization is open to both men and women.

Sigma Tau Epsilon. This society, founded in 1940, selects those women who have attained an overall 2.5 average and demonstrated outstanding leadership, service and sportsmanlike qualities in the organization and activities of the Women's Recreation Association and its affiliated groups.

Eta Sigma Gamma. Epsilon chapter was established at the University of Maryland in May of 1969. This professional honorary organization for health educators was established to promote scholarship and community service for health majors at both the graduate and undergraduate levels. Students may apply after two consecutive semesters with a 2.75 cumulative average.

College of Physical Education, Recreation & Health Departments, Programs and Curricula

Health Education

Professor and Chairman: Burt.
Professors: Johnson, Levitan.
Associate Professors: Clearwater, D. A. Girdano, D. E. Girdano, Miller, Tifft.
Assistant Professors: Althoff, Needle, Stone.
Instructors: McCormack, McLaughlin, Pote, Sands, Yarian.

The curriculum is designed to prepare the student to give leadership in the development of both school and community health. Graduates of the departmental program have placement opportunities as health educators in the public schools, community colleges, as well as in the public voluntary health agencies.

Health Curriculum

		Semester I	Semester II
Freshman Year			
ENGL	General University Requirement	3	
ZOOL	101—General Zoology		4
CHEM	103, 104—General Chemistry	4	4
HLTH	130—Introduction to Health	3	
HLTH	140—Personal and Community Health		3
General University Requirement		3	3
Electives		3	3
Total		16	17
Sophomore Year			
ZOOL	201, 202—Human Anatomy and Physiology	4	4
HLTH	106—Drug Use and Abuse	3	
HLTH	150—First Aid and Safety		2
HLTH	270—Safety Education	3	

General University Requirement		3	9
Electives		3	3
Total		16	18

Junior Year		Semester I	Semester II
HLTH	480—Measurement in Health Education		3
HLTH	310—Introduction to School Health Education	2	
HLTH	420—Methods and Materials in Health Education		3
HLTH	477—Fundamentals of Sex Education	3	
HLTH	489—Independent Study		3
EDHD	300S—Human Development and Learning	6	
EDSF	301—Foundations of Education		3
General University Requirement		3	3
Electives		3	
Total		17	15

Senior Year		Semester I	Semester II
HLTH	340—Curriculum, Instruction and Observation		3
HLTH	450—Health Problems of Children and Youth	3	
HLTH	390—Org. & Adm. of School Health Programs		3
EDSE	330—Principles and Methods of Secondary Education		3
EDSE	367—Student Teaching in Secondary Schools		8
HLTH	489—Independent Studies	3	
General University Requirement		3	
Electives		6	
Total		15	17

Degree Requirements in Health Education. Requirements for the Bachelor of Science degree in health education are as follows:

	Semester Credits
Foundation science courses (ZOOL 101, 201, 202; CHEM 103, 104)	20
General University Requirements	30
Professional Health Education courses (HLTH 106, 130, 140, 150, 270, 310, 420, 477, 489, 340, 450, 480, 390)	40
Education requirements (EDHD 300S, EDSF 301; EDSE 330, 367)	20
Electives	21
Total	131

Minor in Health Education — 24 Hour Minor. Twelve semester hours in health education (HLTH 140, 150, 310, 420, 450).

Twelve semester hours in related areas: Six semester hours of biological science. Six semester hours of psychology or human development.

Minor in Safety Education. Students wishing to obtain a minor in safety education and become certified to teach safety and driver education in junior and senior high schools should take the following courses: HLTH 150 (2), HLTH 260 (2), HLTH 270 (3), HLTH 280 (3), HLTH 305 (3), HLTH 345 (3), ENFP 280 (3), and ENFP 290 (2). In addition, six hours of psychology (other than the general education requirements) are required.

Course Code Prefix—HLTH

Physical Education

Chairman and Professor: Husman.
Professors: Clarke, Eyler, Humphrey, Husman, Ingram, Kelley, Kramer, Steel.
Associate Professors: K. Church, Cronin, Dotson, Hult, SantaMaria.
Assistant Professors: Arrighi, Campbell, Dainis, Freundschuh, Jackson, Johnson, Kesler, Krouse, McKnight, Schmidt, Tyler, VanderVelden, Vaccaro, Wrenn.
Instructors: Balog, Bartley, Danoff, Davis, Drum, Griffiths, Kizabeth, McHugh, Murray, Rees, Sigler, Tyler.
Lecturers: Fry, Noss, Redding.

This curriculum, including three certification options, prepares students (1) for teaching physical education in the secondary school, (2) for coaching, and (3) for leadership in youth and adult groups which offer a program of physical activity. The first two years of this curriculum are considered to be an orientation period in which the student has an opportunity to gain an adequate background in general education as well as in those scientific areas closely related to this field of specialization. In addition, emphasis is placed upon the development of skills in a wide range of motor activities. Further, students are encouraged to select related areas, especially in the fields of biology, social sciences, psychology, health education, and recreation as fields of secondary interest. These materially increase the vocational opportunities which are available to a graduate in physical education.

Equipment: Students may be required to provide individual equipment for certain courses.

Uniforms: Suitable uniforms, as prescribed by the College, are required for the activity classes and for student teaching. These uniforms should be worn only during professional activities.

Departmental Requirements: All Options

		Semester Credit Hours
General University Requirements		30
HLTH	150—First Aid and Safety	1
PHYS	101 or 111 or CHEM 102 or 103 or 105	3-4
PHED	180—Introduction to Physical Education and Health	2
PHED	181—Fundamentals of Movement	2
ZOOL	201, 202—Human Anatomy and Physiology	8
EDHD	300—Human Development and Learning	6
EDSF	301—Foundations of Education	3
PHED	333—Adapted Physical Education	2
PHED	400—Kinesiology	4
PHED	480—Measurement in Physical Education and Health	3
PHED	*Skills Laboratories	22

*Student should discuss this requirement with departmental advisor

K-6 Certification Option

		Semester Credit Hours
EDEL	336—Student Teaching in Elementary Physical Education	8
EDHD	411—Child Growth and Development	3
PHED	420—Physical Education for the Elementary Schools	3
HLTH	470—The Health Program in the Elementary School	3
PHED	491—The Curriculum in Elementary School Physical Education	
	or	
PHED	495—Organization and Administration of Elementary School Physical Education	3
PHED	Electives (9 hours total), PHED 450, PHED 460, PHED 485, PHED 491, PHED 493, or PHED 495	9
Electives		12-13

7-12 Certification Option

		Semester Credit Hours
SPCH	107—Public Speaking	2
PHED	282—Techniques of Officiating	1
PHED	314—Methods in Physical Education for Secondary Schools	3
Theory of Coaching Elective (PHED 323, 324, 325, or 326)		2
EDSE	330—Principles and Methods of Secondary Education	3

PHED	381—Advanced Training and Conditioning	3
EDSE	374—Student Teaching in Secondary Schools	8
PHED	460—Theory of Exercise	3
PHED	485—Motor Learning and Skilled Performance	3
PHED	490—Organization and Administration of Physical Education	3
PHED	493—History and Philosophy of Sport and Physical Education	3
Electives		7-8

K-12 Certification Option

SPCH	107—Public Speaking	2
PHED	314—Methods in Physical Education for Secondary Schools	3
Theory of Coaching Elective (PHED 323, 324, 325, or 326)		2
EDSE	330—Principles and Methods of Secondary Education	3
EDEL	336—Student Teaching in Elementary Physical Education	8
EDSE	374—Student Teaching in Secondary Schools	8
PHED	420—Physical Education for the Elementary Schools	3
PHED	460—Theory of Exercise	3
PHED	490—Organization and Administration of Physical Education	3
PHED	491—The Curriculum in Elementary School Physical Education	
	or	
PHED	495—Organization and Administration of Elementary School Physical Education	3
PHED	493—History and Philosophy of Sport and Physical Education	3
Electives		0-1

Kinesiological Sciences. A new degree curriculum is available for interested students from the Department of Physical Education. It is designed for those students who are vitally interested in the fascinating realm of sport and the human activity sciences, but not necessarily interested in preparing for teaching in the public schools. The body of knowledge explored by this curriculum may be described briefly as follows:

The history of sport, both ancient and contemporary, its philosophical foundations and the study of social factors as they relate to human behavior.

Biomechanics, exercise physiology, the theoretical bases and effects of physical activity, neuromotor learning and the psychological factors inherent in physical performance.

The quantification and description of performance and the relation of these factors to human development.

The program makes possible the broad use of elective credit so that various student interests may be combined on an interdisciplinary basis. With such possibilities available, graduates could reasonably set their sights on occupations in the paramedical fields, such as stress testing and human factors, athletic involvements such as trainers, scouts, sports publicists, or advance to further study in the therapies, as well as graduate work in physical education and allied fields.

Kinesiological Sciences Curriculum

Freshman Year		Credit Hours
ZOOL	101—General Zoology	4
MATH	001—Review of High School Algebra if required	0
MATH	105—Fundamentals of Mathematics	4
	or	
MATH	110—Introduction to Mathematics	3
PSYC	100—Introduction to Psychology	3
PHED	180—Introduction to Physical Education	2
HLTH	140—Personal and Community Health	3
Activity Courses*		2,2
General University Requirements		9
Electives		3
Total		35

*Activity courses in the Freshmen Year are limited to 200 level courses

Sophomore Year		
ZOOL	201, 202—Human Anatomy and Physiology	4,4
PHED	287—Sport & American Society	3
Activity Courses*		2,2
General University Requirements		12
Electives		6
Total		33
Junior Year		
PHED	400—Kinesiology	4
PHED	480—Measurement in Physical Education	3
PHED	455—Physical Fitness of the Individual	3
General University Requirements		6
Restricted Electives**		12-14
Electives		3
Total		31-33
Senior Year		
PHED	450—Psychology of Sport	3
PHED	460—Physiology of Exercise	3
PHED	485—Motor Learning and Skilled Performance	3
PHED	493—History and Philosophy of Sport and Physical Education	3
PHED	496—Quantitative Methods	3
PHED	497—Independent Studies Seminar	3
General University Requirements		3
Electives		7-9
Total		28-30
Minimum hours required for graduation		123

*Activity Courses in the Sophomore Year may be chosen from 200 and 300 level courses

**See departmental advisor for information regarding available options for restricted electives

The Honors Program in Physical Education. The aim of the Honors Program is to encourage superior students by providing an enriched program of studies which will fulfill their advanced interests and needs. Qualified students are given the opportunity to undertake intensive and often independent studies wherein initiative, responsibility and intellectual discipline are fostered. To qualify for admission to the program:

1. A freshman must have a "B" average in academic (college prep) curriculum of an accredited high school.
2. A sophomore must have an accumulative GPA of 3.00 in all college courses of official registration.
3. All applicants must have three formal recommendations concerning their potential, character, and other related matters.
4. All applicants must be accepted by the Faculty Honors Committee.

In completing the program, all honors students must:

1. Participate in an honors seminar where theses and other relevant research topics are studied.
2. Pass a comprehensive oral examination covering subject matter background.
3. Successfully prepare and defend the honors thesis.

On the basis of the student's performance in the above program, the college may vote to recommend graduation without honors, with honors, or with high honors.

Recreation

Professor and Chairman: Humphrey.
Associate Professors: Churchill, Strobell.
Assistant Professors: Leedy, Thompson.
Instructors: Becker, Colton, Fain.

The increased amount of leisure time existent in our society because of the rapid development of modern civilization, and the imperative need for guidance in the

wise use of that leisure time, has made society cognizant of the need for trained recreation leaders.

This curriculum, therefore, is designed to meet the needs of students who wish to qualify for the many positions in the field of recreation, and the needs of those students who desire a background in skills which will enable them to render distinct contributions to community life. The department draws upon various other departments and colleges within the University for courses to balance and enrich its offerings for its recreation curriculum.

Those majoring in recreation have opportunity for observation and practical experience in local, county, state, and federal public recreation programs, in social and group work agency programs, and in the various programs of the Armed Forces, American Red Cross, local hospitals, etc. Major students are encouraged to select an 'option area' of interest around which to center their elective courses (for instance: public recreation, recreation for the ill and handicapped, outdoor recreation, program planning, and resource planning and management).

A very active student University of Maryland Recreation and Parks Society, an affiliate of the comparable state and national organizations, exercises degrees of leadership in selecting the annual "outstanding senior" and "outstanding alumnus" awards, in the granting of the various city, county and state society recreation scholarships, in the programming of the annual 'Governor's Conference on Recreation,' etc. It also provides opportunities for university and community services, for rich practical experience, and for social experiences for those students having a mutual professional recreation interest.

Many outstanding practitioners/educators reside in the Metropolitan Washington, D.C. area. It is the practice of the Department to enrich its course offerings through the use of these individuals as extensively as possible.

Recreation Curriculum

	Semester I	Semester II
Freshman Year		
APDS 101—Fundamentals of Design		3
HLTH 150—First Aid		2
HLTH 140—Personal and Community Health	3	
PHED 182—Rhythmic Activities		2
RECR 130—History and Introduction to Recreation	2	
PHED Elective Skills Laboratory	2 or	2
SPCH 100—Basic Principles of Speech Communication		3
GVPT 170—American Government		3
General University Requirements	9	3
Total	14-16	16-18
Sophomore Year		
RECR 150—Camp Counseling (if no experience)		2
RECR 220—Co-recreational Games and Programs	2	
RECR 221—Nature Lore		2
CRAF 102 or EDIN 106—Recreational Crafts or Industrial Arts in the Elementary School	2	
SPCH 220—Group Discussion	3	
MUSC 155—Fundamentals for the Classroom Teacher		3
Option Requirements		3
General University Requirements	6	8
Electives	3	3
Total	18	19
Junior Year		
PHED Elective Skills Laboratory	2 or	2
RECR 420—Program Planning		3
RECR 460—Leadership Techniques and Practices		3
RECR 495—Pienning, Design, and Maintenance of Park and Recreation Areas and Facilities		3
RECR 450—Camp Management (if previous experience)		3
PHED 420—Physical Education for the Elementary School (or substitute)	3	
EDHD 306—Study of Human Behavior (or substitute)	3	
Option Requirements	3	3
General University Requirements	6	
Total	15-17	15-17
Senior Year		
RECR 490—Organization and Administration of Recreation		3
RECR 349—Observation and Field Work in Recreation		8
SOCY 330—Community Organization (or substitute)	3	
DART 311 or 440—Play Production or Children's Dramatics	3	
Option Requirements	3	
Electives	8	3
Total	17	14
Total		130

Minor in Recreation (24 hours)

18 semester hours in recreation and 6 semester hours in cognate areas, including in the 18 hours the following:

10 hours in RECR 130, 150, 221, 325, 420, 450, 460, 495 or 490; RECR 220; SOCY 330 or substitute

6 hours of work in areas of the recreational skills — nature, arts and crafts, speech and dramatics — but not in the area of the student's major.

2 hours of work in the areas of swimming, sports end dance skills.

or

Other courses approved by the advisor and the various departments involved, depending upon the student's interest and background.

plus

Elective courses (6 hours) selected with the approval of the advisor.

Course Code Prefix—RECR

Division of Mathematical and Physical Sciences and Engineering

Within the Division of Mathematical and Physical Sciences and Engineering, emphasis is placed on preparation of future scientists and engineers, on the teaching of the use of research tools, on acquainting the non-scientist with how science and today's technology affect him, and on teaching the meaning of research in our modern society. Some programs are highly structured with the aim of training specialists in a given area; other programs allow a large degree of flexibility and may permit large numbers of elective courses.

The Division recognizes teaching as its central mission. This includes the teaching of undergraduates, both those within the Division seeking a scientific career and those in other specialties who desire an introduction to the realm of science; the teaching of graduate students, who will become the next generation of teachers and professional scientists and engineers; and teaching at the post-doctoral and research level, for those advanced specialists on their way to assuming major responsibilities at the senior level. The Division provides an intellectual environment that enables each student to realize his or her potential and that offers flexible educational programs to meet a variety of needs. Research into the improvement of teaching and the development of new curricula will be a continuing activity in the Division.

The search for new knowledge is one of the most challenging activities of mankind. The university is one of the key institutions in society where fundamental research is emphasized. The Division of Mathematical and Physical Sciences and Engineering contributes very substantially and effectively to the research activities of the University.

Structure of the Division. The College of Engineering is a major constituent of the MPSE Division, and is headed by its own Dean. All other departments and programs in the Division report directly to the Provost of the Division.

The following departments and programs comprise the Division of MPSE:

1. *Within the College of Engineering:*
   - Department of Aerospace Engineering
   - Department of Chemical Engineering
   - Department of Civil Engineering
   - Department of Electrical Engineering
   - Fire Protection Engineering Program
   - Department of Mechanical Engineering
   - Nuclear Engineering Program
   - Engineering Materials Program
   - Engineering Sciences Program
   - Fire Service Extension Department
   - Wind Tunnel Operations Department
   - Cooperative Engineering Education Program
   - Agricultural Engineering Program
2. *Other Departments and Programs:*
   - Department of Computer Science
   - Department of Mathematics
   - Department of Physics and Astronomy
   - Institute for Fluid Dynamics and Applied Mathematics
   - Institute for Molecular Physics
   - Applied Mathematics Program
   - Astronomy Program
   - Center for Materials Research
   - Chemical Physics Program
   - Meteorology Program
   - Physical Sciences Program

Degree Programs. The following Bachelor of Science Degree programs are offered by the departments and programs of the Division:

Astronomy, Computer Science, Mathematics, Physics, Physical Sciences, Aerospace Engineering, Agricultural Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Engineering (Applied Science Option or Engineering Option), Engineering Technology (Mechanical), Fire Protection Engineering, and Mechanical Engineering.

General Information

The MPSE Undergraduate Office, Y-1110 (454-4906) is the central office for coordinating the advising, processing and updating of student records for students not in the College of Engineering. Inquiries concerning University regulations, transfer credits and other general information should be addressed to this office. Specific departmental information is best obtained directly from the departments.

The records of students in the College of Engineering are processed and kept in the Engineering Student Affairs Office, J-1107 (454-2421). Inquiries concerning Engineering curricula should be addressed there.

The Division is strongly committed to making studies in the sciences and engineering available to all regardless of their background. In particular, the Division is actively pursuing an affirmative action program to rectify the present under-representation of women and minorities in these fields. There are in fact many career opportunities for women and members of minorities in the fields represented by the Division.

Degree Requirements.

A. A minimum of 120 semester hours with at least a C average are required for all Bachelor of Science degrees from the Division. All B.S. degrees conferred by the College of Engineering require more than 120 credits; the exact number varies with the department.
B. 30 credits are specified under the General University Requirements.
C. Major and supporting course work is specified under each department or program.
D. The final 30 semester hours must be completed at the College Park Campus. Occasionally this requirement may be waived by the Provost or Dean for up to six of these 30 credits to be taken at another institution. Such a waiver is granted only if the student already has 30 credits in residence.
E. Students must be enrolled in the program in which they plan to graduate by the time they register for the last 15 hours.

College of Engineering

The College of Engineering offers four-year programs leading either to the degree of Bachelor of Science with curriculum designation in Aerospace Engineering, Agricultural Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, Fire Protection, or to the degree of Bachelor of Science in Engineering with an Engineering option or an Applied Science option, or to the degree of Bachelor of Science in Engineering Technology (Mechanical Engineering Option), or to the degree of Bachelor of Science in Urban Studies (Fire Science Option). In addition, each of the foregoing degree programs may be pursued through the five-year Maryland Plan for Cooperative Engineering Education. The engineering programs integrate these elements: (1) basic sciences, including mathematics, physics, chemistry; (2) engineering sciences including mechanics of solids and fluids, engineering materials, thermo-dynamics, electricity, and magnetism; (3) professional studies in major fields of engineering specialization; and (4) general studies including liberal arts and social studies as part of the General University Requirements.

Each program lays a broad base for *continued learning* after college in professional practice, in business or industry, in public service, or in graduate study and research.

Increasingly, the boundary between engineers and applied scientists or applied mathematicians becomes less distinct. The various disciplines of engineering similarly interact with each other, as technical problems become more sophisticated, and require a combined attack from several disciplines. The engineer occupies an intermediate position between science and the public, because, in addition to the understanding of scientific principles, the engineer is concerned with the timing, economics and values that define the useful application of those principles.

College Regulations. The responsibility for proper registration and for satisfying stated prerequisites for any course rests with the student — as does the responsibility for proper achievement in courses in which the student is enrolled. Each student should be familiar with the provisions of this catalog, including the *Academic Regulations*, contained in Section 1.

1. General information, and other pertinent regulations.
2. Required courses in mathematics, physics and chemistry have highest priority; and it is strongly recommended that every engineering student register for mathematics and chemistry — or mathematics and physics — each semester until the student has fully satisfied requirements of the College of Engineering in these subjects.
3. To be eligible for a bachelor's degree in the College of Engineering, a student must have an average of at least C — 2.0 — (a) in all subjects applicable to the degree, and (b) in all junior-senior courses in the major field. Responsibility for knowing and meeting all degree requirements for graduation in any curriculum rests with the student.
4. A student in the College of Engineering may audit a course only with the understanding that the course may not be taken for credit subsequent to the registration as audit. The student must also have the consent of the department offering the course. Forms requesting permission to audit courses are available in the Engineering Student Affairs Office, J-1107.

5. The College of Engineering requires that a minimum of eighteen (18) semester credit hours out of the 30 hour General University Requirements be taken in the general area of humanities and social sciences (H&SS). The program selected should be planned to reflect a rationale or to fulfill an objective appropriate to the engineering profession and to increase the engineer's awareness of social responsibilities and improve the ability to consider related factors in the decision-making process. Skill, or professionally oriented courses treating such subjects as accounting, industrial management, finance, personnel administration, the performing arts, certain education courses, and introductory foreign languages normally do not fulfill this objective and may not be included in the eighteen (18) semester hour requirement of the College. Engineering students may obtain in the Engineering Student Affairs Office (J-1107) a list of many courses which satisfy this requirement.

Structure of Engineering Curricula. Courses in the normal curriculum or program and prescribed credit hours leading to the degree of Bachelor of Science (with curriculum designation) are outlined in the sections pertaining to each department in the College of Engineering. No student may modify the prescribed number of hours without special permission from the dean of the college. The courses in each curriculum may be classified in the following categories:

1. Courses in the General University Requirements — An engineering student must include eighteen credits of humanities and social sciences in the program of general studies.
2. Courses in the physical sciences — mathematics, chemistry, physics.
3. Collateral engineering courses — engineering sciences, and other courses approved for one curriculum but offered by another department.
4. Courses in the major department. A student should obtain written approval for any substitution of courses from the department chairman and the dean of the college.

The courses in each engineering curriculum, as classified above, form a sequential and developmental pattern in subject matter. In this respect, curricula in engineering may differ from curricula in other colleges. Some regulations which are generally applicable to all students (see the *Academic Regulations)* may need clarification for purposes of orderly administration among engineering students. Moreover, the College of Engineering establishes policies which supplement the University regulations.

Basic Format of the Freshman-Sophomore Years in Engineering. The freshman and sophomore years in engineering are designed to lay a strong foundation in mathematics, physical sciences and the engineering sciences upon which the student will later develop a professional program during the upper division (junior and senior) years. The College course requirements for the freshman year are the same for all students, regardless of their intended academic program, and about 75% of the sophomore year course requirements are common, thus affording the student a maximum flexibility in choosing a specific area of engineering specialization. Although the engineering student selects a major field at the start of the sophomore year, this intramural program commonality affords the student the maximum flexibility of choice or interdepartmental transfer up to the end of the sophomore year.

General College Requirements for the Freshman and Sophomore Years

	Credit Hours
A. General University Requirements	15
B. Mathematics. Four courses in mathematics are required to be selected from MATH 140, 141, 240, 241, and 246.	15
C. Physical Sciences. A minimum of 19 credit hours in Physics and Chemistry must be completed, with not less than seven (7) in either field.	19
D. Engineering Sciences. Nine (9) credit hours must be completed in the Engineering Sciences, to be selected from ENES 101, ENES 110, ENES 220 and ENES 221. Each is a three (3) credit hour course.	9
E. Engineering Sciences, Mathematics, Physical Sciences or Major Field Engineering. Eight (8) credit hours to complete the freshman-sophomore year requirements may be in any of the fields indicated, but no more than six (6) credit hours may have a major field designation.	8
Total Minimum Academic Credits in freshman-sophomore years	66

Basic Freshman Curriculum in Engineering. All freshmen in the College of Engineering are required to complete the following basic curriculum for freshmen regardless of whether the student plans to proceed through one of the major field designated baccalaureate degree programs or follow any of the multidisciplinary, non-designated degree curricula that are sponsored by the College.

Course No. and Title		Semester I	Semester II
CHEM	103, 104—General Chemistry**	4	4
PHYS	161—General Physics I		3
MATH	140, 141—Analysis I, II	4	4
ENES	101—Intro. Engr. Science	3	
ENES	110—Statics		3
General University Requirements		6	3
Total Credits		17	17

Students who are not prepared to schedule MATH 140 are advised to register for a preparatory course — MATH 115 — as part of their General University Requirement. These students are also advised to attend summer school following their freshman year to complete MATH 141 and PHYS 161 prior to entrance into the sophomore year of study. MATH 141 and PHYS 161 are prerequisites for many courses required in the sophomore year.

**Qualified students may elect to take CHEM 105 and 106 (4 cr hrs. each) instead of CHEM 103 and 104

The Sophomore Year in Engineering. With the beginning of the sophomore year the student selects a sponsoring academic department (Aerospace, Agricultural, Chemical, Civil, Electrical, Fire Protection, or Mechanical Engineering) and this department assumes the responsibility for the student's academic guidance, counseling and program planning from that point until the completion of the degree requirements of that department as well as the College.

Sophomore Curriculum in Engineering

		Semester I	Semester II
General University Requirements		3	3
MATH	241—Analysis III	4	
MATH	246—Differential Equations		3
PHYS	262, 263—General Physics	4	4
ENES	220—Mechanics of Materials	3*	
ENES	221—Dynamics		3*
Major field or related courses		2 or 4	2 or 5*
Total Credits		16 or 18	15 or 18

*For specific requirements, see the curriculum listing in each engineering department.

Dual Degree Program. The Dual Degree Program is a cooperative arrangement between the College of Engineering and selected liberal arts colleges which allows students to earn undergraduate degrees from both institutions in a five-year program. A student in the Dual Degree Program will attend the liberal arts college for approximately three (3) academic years (minimum 90 hours) and the University of Maryland, College of Engineering for approximately two (2) academic years (minimum hours required —

determined individually, approximately 60 hours).

Dual degree candidates may participate in any of the baccalaureate degree programs in the College of Engineering.

Frostburg State College, Notre Dame College, Trinity College and American University are participating institutions in the Dual Degree Program. At the present time several other colleges are developing cooperative agreements to participate in the program. A complete list of participating institutions may be obtained from the Engineering Student Affairs Office (J-1107) of the College of Engineering.

Co-operative Engineering Education Program. The Maryland Plan for Co-operative Engineering Education at the University of Maryland, offered by the College of Engineering, is a four and one half to five calendar year program leading to a Bachelor of Science degree. The academic requirements for students following the Co-op Plan of Education are identical to the academic requirements for those students following the regular four-year program. In addition to the normal academic requirements, Co-op students have scheduled periods of professional internship which must be satisfactorily completed to qualify for the baccalaureate degree under the Co-op Plan.

The Co-op Program begins after the student has completed the freshman and sophomore requirements of a major field. The structure of Engineering Co-op is an alternating sequence of study and internship. As far as Co-op is concerned, there are three sessions — fall and spring semesters (20 weeks each) and a summer session (10 weeks). This alternating plan of study and professional internship lengthens the last two academic years into three calendar years. Delaying entry into the Co-op Program until the junior year offers considerable educational advantages to the student.

The student retains the normal freshman-sophomore program to afford time for the selection of a major field of engineering . . . or to determine whether to continue in engineering . . . without a commitment to either the regular four-year or the Co-op Plan of Education. A more mature and meaningful series of professional internship assignments are possible to benefit both the student and the professional partner. Also, the plan is readily adaptable to the needs of the student transferring to the University from the engineering transfer programs of community or state colleges.

Students need only meet two criteria for entry into the Engineering Co-op Program. They are (1), completion of the sophomore requirements (usually about 65 degree credits) and (2), the establishment of a cumulative grade point average at the *University of Maryland* of at least a 2.0/4.0.

A *typical* study-intern schedule is shown below. The typical student begins the first internship in the summer immediately following the sophomore year (65 accumulated degree credits). The total internship is for two summers and two semesters (60 weeks). The student enrolls for 16 semester hours each during the fall and spring semesters, 12 semester hours during the summer and three semester hours in the evening during two internship periods.

Typical Study-Intern Schedule

		Semester Hours Current	Accumulated
Summer*	Intern (1)‡	—	65
Fall Semester	Study	16	81
Spring Semester†	Intern (2,3)	3§	84
Summer	Study	12	96
Fall Semester†	Intern (4,5)	3§	99
Spring Semester	Study	16	115
Summer*	Intern (6)	—	115
Fall Semester	Study	16	131 (Grad)

*Students enroll for ENCO 408 (6 non-degree credits)

‡These numbers refer to 10-week periods.

†Students enroll for ENCO 408 and 409 (12 non-degree credits).

§These courses could possibly be taken during the evening at the University College, or at a college located near your employment.

Students make their own arrangements for board and lodging while on their periods of internship. Frequently the participating industrial company or governmental agency will assist the student in locating good, inexpensive lodging. The internship wages are paid directly to the student by his or her employer.

During the semesters or summer sessions in which the student attends school, the student pays the regular tuition and fees assessed by the University. A $30 fee is charged for each 10-week period of professional internship. The professional intern fee is payable at the beginning of each intern period and is not refundable.

Engineering Departments, Programs and Curricula

Bachelor of Science Degree in Engineering

The "B.S.-Engineering" program is designed to serve three primary functions: (1) to prepare those students who wish to use the breadth and depth of their engineering education as a preparatory vehicle for entry into post-baccalaureate study in such fields as medicine, law, or business administration; (2) to provide the basic professional training for those students who wish to continue their engineering studies on the graduate level in one of the newer interdisciplinary fields of engineering such as environmental engineering, bio-medical engineering, systems engineering, and many others; and finally (3) to educate those students who do not plan a normal professional career in a designated engineering field but wish to use a broad engineering education so as to be better able to serve in one or more of the many auxiliary or management positions of engineering related industries. The program is designed to give the maximum flexibility for tailoring a program to the specific future career plans of the student. To accomplish these objectives, the program has two optional paths: an engineering option and an applied science option.

The "Engineering" option should be particularly attractive to those students contemplating graduate study or professional employment in the interdisciplinary engineering fields, such as environmental engineering, bio-engineering, bio-medical engineering, and systems and control engineering, or for preparatory entry into a variety of newer or interdisciplinary areas of graduate study. For example, a student contemplating graduate work in environmental engineering might combine chemical and civil engineering for his or her program; a student interested in systems and control engineering graduate work might combine electrical engineering with aerospace, chemical, or mechanical engineering.

The "Applied Science" option should be particularly attractive to those students who do not plan on professional engineering careers, but wish to use the rational and developmental abilities fostered by an engineering education as a means of furthering career objectives. Graduates of the Applied Science Option may aspire to graduate work and an ultimate career in a field of science, law, medicine, business, or a variety of other attractive opportunities which build on a combination of engineering and a field of science. Entrance requirements for Law and Medical Schools can be met readily under the format of this program. In the applied science program, any field in the University in which the student may earn a B.S. degree is an acceptable secondary science field, thus affording the student a maximum flexibility of choice for personal career planning.

Listed below are the minimum requirements for the B.S.-Engineering degree with either an Engineering option or an Applied Science option. The 66 semester credit hours required for the completion of the junior and

senior years is superimposed upon the freshman and sophomore curriculum of the chosen primary field of engineering. The student, thus, does not make a decision whether to take the designated or the undesignated degree in an engineering field until the beginning of the junior year. In fact, the student can probably delay the decision until the spring term of the junior year with little or no sacrifice, thus affording the student ample time for decision. Either program may be taken on the regular 4-year format or under the Maryland Plan for Cooperative Engineering Education.

Junior-Senior Requirements for the Degree of B.S.-Engineering

Requirements	Engineering Option	Applied Science Option
General Univ. Req.	15 sh.	15 sh.
Mathematics, Physical Sciences, req.[3]	3 sh.	3 sh.
Engineering Sciences[1,3]	6 sh.[2]	6 sh.
Primary Field[4]	24 sh. (Engr.)	18 sh. (Engr.)
Secondary Field	12 sh. (Engr.)	12 sh. (Science)
Approved Electives[3,6]	6 sh. (Technical)	9 or 10 sh.
Sr. Research/Project[5]		3 or 2 sh.
	66	66

Engineering Fields of Concentration available under the B.S.-Engineering program as primary fields within either the Engineering option or the Applied Science option are as follows:

Aerospace Engineering
Agricultural Engineering
Chemical Engineering
Civil Engineering
Electrical Engineering
Engineering Materials
Mechanical Engineering
Nuclear Engineering

In addition, the field of Fire Protection is available within the applied science option as a primary field. All engineering fields of concentration may be used as a secondary field within the engineering option.

(1) Engineering sciences, for the purpose of this degree, are those courses in the Engineering College prefixed by ENES, or, are in an engineering field not the primary or secondary field of engineering concentration.
(2) Students following the "Engineering" option may use up to six sh. of course work at the 100 or 200 course number level in the primary or the secondary field of engineering concentration as an engineering science.
(3) A minimum of 50% of the course work in the mathematics, physical sciences, engineering sciences and elective areas must be at the 300 or 400 course number level.
(4) All of the courses used to fulfill the fields of concentration requirements (36 sh. in the engineering option and 30 in the Applied Science option) must be at the 300 course number level or above.
(5) For the applied science option each student is required — unless specifically excused, and if excused, 15 sh. of approved electives will be required — to satisfactorily complete a senior level project or research assignment relating the engineering and science fields of concentration.
(6) In the Engineering option, the 6 sh. of electives must be technical (math, physical sciences, or engineering sciences but may not be in the primary or secondary fields of concentration). In the Applied Science option, the approved electives should be selected to strengthen the student's program, consistent with career objectives. Courses in the primary or secondary fields of concentration may be used to satisfy the approved electives requirement.

General Regulations for the B.S.-Engineering Degree. All undergraduate students in engineering will select their major field sponsoring department at the beginning of their second year regardless of whether they plan to proceed to a designated or an undesignated degree. A student wishing to elect the undesignated degree program may do so at any time following the completion of the sophomore year, or a minimum of 50 earned credits towards any engineering degree, and at least one semester prior to the time the student expects to receive the baccalaureate degree. As soon as the student elects to seek an undesignated baccalaureate degree in engineering, the student's curriculum planning, guidance and counseling will be the responsibility of the "Undesignated Degree Program Advisor" in the primary field department. At least one semester before the expected degree is to be granted, the student must file an "Application for Admission to Candidacy for the Degree of Bachelor of Science in Engineering" with the Dean's Office of the College of Engineering. The candidacy form must be approved by the chairman of the primary field department, the primary engineering and the secondary field advisors and the college faculty committee on "Undesignated Degree Programs." This committee has the responsibility for implementing all approved policies pertaining to this program and reviewing and acting on the candidacy forms filed by the student.

Specific University and College academic regulations apply to this undesignated degree program in the same manner as they apply to the conventional designated degree programs. For example, the academic regulations of the University apply as stated in the College Park Catalog of the University of Maryland, and the College requirement of 2.00 factor in the major field during the junior and senior years apply. For the purpose of implementation of such academic rules, the credits in the primary engineering field and the credits in the secondary field are considered to count as "the Major" for such academic purposes.

Environmental Engineering. Environmental engineering is the application of basic engineering and science to the problems of the environment to ensure optimum environmental quality. In recent years, humans have suffered a continually deteriorating environment. A truly professional engineer involved in the study of environmental engineering must see the total picture and relate it to a particular mission whether this be air pollution, water quality control, environmental health or solid and liquid waste disposal. The total picture includes urban systems design, socio-economic factors, regional planning, transportation, recreation, water resource development, and land and resource conservation.

A student who selects the B.S.-Engineering degree program can specialize in environmental engineering by proper selection of primary and secondary fields from the wide selection of courses related to environmental engineering given by the various departments in the College.

Engineering — Medicine. Advanced technology is finding increasingly sophisticated applications in medical care delivery and research. Pacemakers, heart-assist pumps, kidney dialysis machines, and artificial limbs are only a few examples of the role of engineering and technology in medicine. In addition, diagnostic procedures and record-keeping have been greatly enhanced by the use of computers and electronic testing equipment. There is a growing need for physicians and researchers in the life sciences, having strong backgrounds in engineering, who can effectively utilize these technologies and who can work with engineers in research and development.

The Bachelor of Science in Engineering degree provides the student an excellent opportunity to develop a professional level of competence in an engineering discipline while at the same time meeting the entrance requirements for medical school. Under the Applied Science option, the student could select any engineering field of most interest to him, and his or her secondary field would usually be Chemistry or Zoology. In addition to the medical school entrance requirements, he or she would complete 12 credits of advanced work in his or her secondary field.

Under the Engineering option, the student would generally combine Chemical Engineering (as either primary or secondary field) with another engineering discipline. This option allows the student to complete more advanced work in his primary field of engineering than does the Applied Science option. Either option can be completed in a four year period with careful planning and scheduling.

Aerospace Engineering

Professor and Chairman: Anderson.
Professors: Corning, Melnik, Pai, Rivello, Sherwood.
Associate Professors: Barlow, Donaldson, Jones, Plotkin, Schaeffer.

Instructor: Greenwood.
Lecturers: Billig (p.t.), Case (p.t.), Finkleman (p.t.), Fleig (p.t.), Genalis (p.t.), Piaewonsky (p.t.), Saczalsky (p.t.).

Aerospace engineering is focused on the physical understanding and design considerations of aircraft and space vehicles of all kinds. For example, consider the high-speed flight of NASA's future Space Shuttle. The airflow over the wings, fuselage and tail surfaces creates lift, drag and moments on the aircraft. If the velocity is high enough, such as during re-entry of the Apollo into the Earth's atmosphere, then the temperature of the airflow becomes extremely high, the air becomes chemically reacting, and heating of the vehicle's surface becomes a major problem. The study of how and why the airflow produces these forces, moments and heating is called *Aerodynamics.* In turn, the motion of the aircraft or space vehicle will respond to, indeed will be determined by, the aerodynamic forces and moments. The study of the motion and flight path of such vehicles is called *Flight Mechanics.* Of course, while executing this motion, the vehicle must be structurally sound, that is, its surface and internal structure must be able to withstand the severe forces and loads associated with flight. The study of the mechanical behavior of materials, stresses and strains, deflections and vibrations that are associated with the structure of the vehicle itself is called *Flight Structures.* In the same vein, the motion of any aircraft or space vehicle must be initiated and maintained by a propulsive mechanism such as the classic combination of a reciprocating engine with a propeller, or the more modern turbojets, ramjets and rockets. The study of the physical fundamentals of how these engines work is called *Flight Propulsion.* Finally, all of the above are synthesized into one system with a specific application — such as a complete DC-10 or a Skylab — through a discipline called *Aerospace Vehicle Design.*

The Department of Aerospace Engineering at the University of Maryland offers a rigorous and balanced education which includes all of the above disciplines. The goal of this program is to create professionally oriented aerospace engineers with an understanding of the physical fundamentals underlying atmospheric and space flight, and with the capability of applying this knowledge for useful and exciting purposes. Moreover, the physical background and design synthesis that marks aerospace engineering education also prepares a student to work productively in other fields. For example, at this moment aerospace engineers are actively working on the solution of environmental and societal problems, on the energy crisis, and in the field of medicine.

Aerospace Engineering Curriculum

		Semester I	Semester II
Sophomore Year			
General University Requirements		3	3
MATH	240—Linear Algebra	4	
MATH	241—Analysis III		4
PHYS	262, 263—General Physics	4	4
ENES	240—Algorithmic Analysis — Computer Programming	3	
ENES	220—Mechanics of Materials		3
ENAE	201, 202—Introduction to Aerospace Engineering I, II	2	2
ENAE	203—Technical Report Writing	1	
	Total Credits	17	16
Junior Year			
General University Requirements		3	3
MATH	246—Differential Equations	3	
ENES	221—Dynamics	3	
ENME	216—Thermodynamics[1]		3
ENEE	300—Principles of Electrical Engineering	3	
ENAE	305—Aerospace Laboratory I		3
ENAE	345—Introduction to Dynamics of Aerospace Systems		3
ENAE	451, 452—Flight Structures I, II[1]	4	3
ENAE	371—Aerodynamics I[1]		3
	Total Credits	16	18

Senior Year		Credits
ENAE	471—Aerodynamics II[1]	3
ENAE	475—Viscous Flow & Aerodynamic Heating	3
ENAE	401—Aerospace Laboratory II	2
ENAE	402—Aerospace Laboratory III	1
ENAE	461—Flight Propulsion I	3
General University Requirements		9
Design Elective[2]		3
Applied Dynamics Elective[3]		3
Aerospace Elective[4]		3
Technical Elective[5]		3
	Total Credits	33

[1]Students planning to take ENAE 462 Flight Propulsion II as a senior elective should take ENME 216, ENAE 371, and ENAE 471 one semester earlier than shown in the above curriculum and delay ENAE 451 and ENAE 452 by one semester
[2]The student shall take one of the following design courses.
ENAE 411—Aircraft Design
ENAE 412—Design of Aerospace Vehicles
[3]The student shall take one course which utilizes dynamics in a system analysis. The following courses are offered
ENAE 445—Stability and Control of Aerospace Vehicles
ENAE 355—Aircraft Vibrations
[4]Three credits must be taken from elective courses offered by the Aerospace Engineering Department. Currently offered courses are
ENAE 415—Computer-Aided Structural Design Analysis
ENAE 453—Matrix Methods in Computational Analysis
ENAE 457—Flight Structures III
ENAE 462—Flight Propulsion II
ENAE 472—Aerodynamics III
ENAE 473—Aerodynamics of High Speed Flight
ENAE 488—Topics in Aerospace Engineering
ENAE 499—Elective Research
Courses listed under 2 and 3 above and not used to meet the requirements of 2 and 3 may also be elected to fulfill requirement 4
[5]Any 3 credit technical course with a course number of 300 or above may be taken as a technical elective. Courses available as Aerospace Electives may be used as the technical elective.

Course Code Prefix—ENAE

Agricultural Engineering

Professor and Chairman: Harris.
Professors: Green, Krewatch (Emeritus), Winn, Jr.
Associate Professors: Felton, Hummel, Merkel, Merrick (Emeritus), Stewart, Wheaton.
Assistant Professors: Grant, Johnson, Ross.
Lecturer: Holton.
Instructor: Carr.
Visiting Professor: Cowan.
Visiting Assistant Professor: Rebuck.

Agricultural engineering utilizes both the physical and biological sciences to help meet the needs of our increasing world population for food, natural fiber and improvement or maintenance of the environment. Scientific and engineering principles are applied to the conservation and utilization of soil and water resources for food production and recreation; to the utilization of energy to improve labor efficiency and to reduce laborious and menial tasks; to the design of structures and equipment for housing or handling of plants and animals to optimize growth potential; to the design of residences to improve the standard of living for the rural population; to the development of methods and equipment to maintain or increase the quality of food and natural fiber; to the flow of supplies and equipment to the agricultural and aquacultural production units; and to the flow of products from the production units and the processing plants to the consumer. Agricultural engineers place emphasis on maintaining a high quality environment as they work toward developing efficient and economical engineering solutions.

The undergraduate curriculum provides opportunity to prepare for many interesting and challenging careers in design, management, research, education, sales, consulting, or international service. The program of study includes a broad base of mathematical, physical and engineering sciences combined with basic biological sciences. Twenty hours of electives give

flexibility so that a student may plan a program according to his major interest.

Course Code Prefix—AGEN

Departmental Requirements

		Semester Credit Hours
AGEN	324—Engineering Dynamics of Biological Materials	3
AGEN	424—Functional and Environmental Design of Agricultural Structures	3
AGEN	343—Functional Design of Machinery and Equipment	3
AGEN	421—Power Systems	3
AGEN	422—Soil and Water Engineering	3
ENCE	350—Structural Analysis and Design I	3
ENES	101—Intro. Engineering Science	3
ENES	110—Statics	3
ENES	220—Mechanics of Materials	3
ENES	221—Dynamics	3
ENME	300—Materials Science and Engineering	
	or	
ENCE	300—Fund. of Engineering Materials	3
ENME	216—Thermodynamics	3
ENME	342—Fluid Mechanics I	
	or	
ENCE	330—Basic Fluid Mechanics	3
ENEE	300—Prin. of Electrical Engineering	3
MATH	140, 141—Analysis I, II	4,4
MATH	241—Analysis III	4
MATH	246—Differential Equations for Scientists and Engineers	3
ZOOL	101—General Zoology	
	or	
BOTN	101—General Botany	4
CHEM	103, 104—College Chemistry I, II	4,4
PHYS	161, 262, 263—General Physics	3,4,4
Technical Electives*		14
General University Requirements**		30
Electives		6

*Technical electives, related to field of concentration, must be selected from a departmentally approved list. Eight credits must be 300 level and above

**Students must consult with departmental advisors to ensure the selection of appropriate courses for their particular program of study.

Chemical Engineering

Professor and Chairman: Gomezplata.
Program Director, Chemical Engineering: Cadman.
Professors: Arsenault, Beckmann, Bolsaitis, Cadman, Duffey, Johnson, Marchello, Munno, Regan, Schroeder, Silverman, Skolnick, Smith, Spain.
Associate Professors: Almenas, Gentry, Roush, Sheaks, Spivak.
Assistant Professors: Blair, Gasner, Hatch, King.
Lecturers: Belcher, Dedrick.
Instructor: Paauwe.

The Chemical Engineering Department offers programs in chemical, materials and nuclear engineering. In addition, study programs in the areas of applied polymer science, biological and environmental health engineering are available. The latter programs are interdisciplinary with other departments of the University.

The departmental programs prepare an undergraduate for continued graduate study or immediate industrial employment following the baccalaureate degree.

The Chemical Engineering program involves the application of sound engineering and economic principles — and basic sciences of mathematics, physics and chemistry — to process industries concerned with the chemical transformation of matter. The chemical engineer is primarily concerned with research and process development leading to new chemical process ventures or a better understanding of existing ones; with the efficient operation of the complete chemical plant or its component units; with the technical services engineering required for improving and understanding chemical plant operation and the products produced; with the chemical sales and economic distribution of the chemical plant product, and with the general management and executive direction of chemical process industry plants and industrial complexes.

Because of this wide range of ultimate applications, the chemical engineer finds interesting and diverse career opportunities in such varied fields as chemical (inorganic and organic), food processing and manufacture, metallurgical, nuclear and energy conversion, petroleum (refining, production, or petrochemical), and pharmaceutical industries. Additional opportunities are presented by the research and development activities of many public and private research institutes and allied agencies.

Chemical Engineering Curriculum

		Semester I	Semester II
Sophomore Year			
General University Requirements			3
MATH	241—Analysis III	4	
MATH	246—Differential Equations		3
PHYS	262, 263—General Physics II, III	4	4
ENES	220—Mechanics of Materials	3	
CHEM	201, 203—College Chemistry III, IV	3	3
CHEM	204—College Chemistry Laboratory IV		2
ENCH	215—Chemical Engineering Analysis I	3	
ENCH	250—Chemical Engineering Analysis II		2
	Total	17	17
Junior Year			
General University Requirements		3	3
ENCH	440—Chemical Engr. Kinetics		3
ENCH	442—Chemical Engineering Systems Analysis and Dynamics		2
ENCH	443—Dynamics and Control Lab		1
CHEM	481, 482—Physical Chemistry	3	3
CHEM	430—Chemical Measurements Laboratory I	3	
Technical Elective			2
ENCH	295—Chemical Process Thermo.	3	
ENCH	425, 427—Transfer and Transport Process I, II	4	3
	Total	16	17
Senior Year			
General University Requirements		6	6
ENEE Electives		3	
ENCH	333—Seminar		1
ENCH	437—Chemical Engineering Lab	3	
ENCH	445—Process Engr. and Design		3
ENCH	447—Chem. Engineering Econ.		2
Technical Electives*		5	4
	Total	17	16

*Technical elective requirements. Two courses must be selected from a single area of concentration listed below. One of the courses must be a laboratory type course. In addition, credits in ENCH 468—Research must be taken in the area of concentration.

ENCH 482—Biochemical Engineering (3)
ENCH 485—Biochemical Engineering Laboratory (2)
ENCH 490—Introduction to Polymer Science (3)
ENCH 492—Applied Physical Chemistry of Polymers (3)
ENCH 494—Polymer Technology Laboratory (3)
ENCH 450—Chemical Process Development (3)
ENCH 461—Control of Air Pollution Sources (3)
ENCH 455—Chemical Process Laboratory (2)
ENCH 452—Advanced Chemical Engineering Analysis (counts as laboratory) (3)
ENCH 453—Applied Mathematics in Chemical Engineering (3)
ENCH 454—Chemical Process Analysis and Optimization (3)

Civil Engineering

Professor and Chairman: Carter.
Professors: Allen (Emeritus), Birkner, Heins, Israel, Lepper, Otts, Ragan, Sternberg.
Associate Professors: Colville, Cookson, Cournyn, Garber, Hall, McCuen, Piper, Wedding, Witczak.
Assistant Professors: Albrecht, Loutzenheiser, Mulinazzi, Vannoy.
Visiting Professors: Baker (p.t.), Rib (p.t.).
Lecturer: Rajan (p.t.).

Civil Engineering Curriculum. Civil engineering is concerned with the planning, design, construction and operation of large facilities associated with man's environment. Civil engineers specialize in such areas as environmental engineering, transportation systems, structures, water resource development, water supply and pollution control, urban and regional planning, construction management, and air pollution control. Many civil engineers enter private practice as consulting engineers or start their own businesses in the construction industry. Others pursue careers with local, state, and federal agencies or with large corporations.

The undergraduate program is founded on the basic sciences and emphasizes the development of a high degree of technical competence. The program orients the student toward computer aided design techniques and prepares him or her to incorporate new concepts that will develop during his or her professional career. Further, the program stresses the balance between technical efficiency and the needs of society. The graduate is prepared to enter one of the areas mentioned above, or he or she can move into new areas of specialization such as oceanographic engineering or the development of facilities for extra-terrestrial environments.

At no time has man been more concerned with the quality of the environment. Man is concerned with broad environmental problems such as pollution and the operation of transportation systems. Man is also concerned with problems such as a need for new approaches in the design and construction of buildings. The civil engineering profession faces the greatest challenge in its history as it assumes a central role in the solution of the physical problems facing the urban-regional complex.

		Semester I	Semester II
Sophomore Year			
MATH	241—Analysis III	4	
MATH	246—Differential Equations for Scientists and Engineers		3
PHYS	262, 263—General Physics II, III	4	4
ENES	220—Mechanics of Materials	3	
ENES	221—Dynamics		3
ENCE	280—Engineering Survey Measurements	3	
ENCE	221—Introduction to Environmental Engineering		3
General University Requirements		3	3
Total Credits		17	16
Junior Year			
ENCE	300—Fundamentals of Engineering Materials	3	
ENCE	330—Basic Fluid Mechanics	3	
ENCE	340—Fundamentals of Soil Mechanics		3
ENCE	350, 351—Structural Analysis and Design I, II	3	3
ENCE	360—Engineering Analysis and Computer Programming	4	
ENCE	370—Fundamentals of Transportation Engineering	3	
ENME	215—Principles of Mechanical Engineering		
or			
ENCH	295—Chemical Process Thermodynamics		3
ENCE—Technical Electives (Group A, B, C, or D)*			3
General University Requirements			6
Total Credits		16	18

*See notes concerning electives.

Senior Year			
ENCE—Technical Elective (Group A, B, C, or D)*		7	3***
ENCE—Technical Elective (Group E, F, or G)*		3***	3***
ENEE	300—Principles of Electrical Engineering		3
Technical Elective**			3
General University Requirements		6	3
Total Credits		16	15

*See notes concerning Technical Electives
**One course from the available Technical Electives in Civil Engineering or approved Technical Elective outside department.
***These numbers represent three-semester-credit courses. Additional semester credits will be involved to the extent that courses carrying more than three credits are selected

Notes Concerning Technical Electives in Civil Engineering. A minimum of 22 credit hours of technical electives are required as follows:

(1) All 3 courses from one area of concentration A, B, C, or D.

(2) 1 course in one other area of concentration A, B, C or D.

(3) 6 hours in areas of concentration E, F, or G.

(4) Any one course in the following list or approved technical course outside the department.

Areas of Concentration

(A) Structures
ENCE 450 (3)
ENCE 451 (4)
ENCE 460 (3)

(B) Water Resources
ENCE 430 (4)
ENCE 431 (3)
ENCE 432 (3)

(C) Environmental
ENCE 433 (3)
ENCE 434 (3)
ENCE 435 (4)

(D) Transportation
ENCE 470 (4)
ENCE 471 (3)
ENCE 472 (3)

(E) Mechanics and Materials
ENCE 410 (3)
ENCE 411 (4)

(F) Soil Mechanics
ENCE 440 (3)
ENCE 441 (3)

(G) Systems Analysis and Planning
ENCE 420 (3)
ENCE 461 (3)
ENCE 463 (3)

(H) Special Studies (Max. 3 credits)
ENCE 489 (3)

Course Code Prefix—ENCE

Electrical Engineering

Professor and Chairman: Harger.
Professors: Caceres (p.t.), Chu, DeClaris, Hochuli, Kim, Ligomenides, Lin, Newcomb, Rao, Reiser, Rutelli (Emeritus), Taylor, Wagner, Weiss.
Associate Professors: Basham, Emad, Ephremides, Lee, Levine, Pugsley, Rhee, Simons, Torres, Tretter, Zajac, Zaki.
Assistant Professors: Baras, Destler, Eden, Gallman, O'Grady, Paez, Silio, Striffler, Vaca.
Lecturers: Colburn (p.t.), Pottala (p.t.), Schulman (p.t.).
Instructor: Bailey.

Flexibility is the main characteristic of the program in Electrical Engineering. The student can specialize, or he or she can have a broader education, as he or she chooses. This is established through broad elective structure both within and outside the Electrical Engineering Department.

Specialization areas available to the student are: Biomedical, Circuits, Communications, Computers, Control, and Electrophysics. These areas include such fields as: Electronics, Integrated Circuits, Bioelectronics, Solid State Devices, Lasers, Radar, Radio, Space Navigation, Information Theory, Telemetry, Antennas, Automatic Control, System Theory, Cybernetics, Computer Software and Hardware, Particle Accelerators, Electromechanical Transducers, Energy Conversion, and many others.

Apprenticeship programs allow qualified undergraduate students to work with research laboratory directors in the Department, thus giving the student a chance for a unique experience in research and engineering design.

Projects in Electrical Engineering allow undergraduate students to do independent study under the guidance of a faculty member in an area of mutual interest.

A new Fundamentals Laboratory and several Specialty Laboratory courses have been established. These are self contained and may be taken independently of related theoretical courses. These laboratories provide

theoretical and practical experience in classical and modern topics using up-to-date equipment.

The boundary between electrical engineering and applied mathematics or applied physics is becoming steadily less distinct, particularly at the research level. Simultaneously, the technological problems and needs of society are becoming steadily more complex. The engineer is the intermediary between science and society. To solve the problems of modern society he or she must fully understand the most modern devices and methodologies available. To find the best solution he or she must have a very broad interdisciplinary education. To find a solution that is also acceptable to society he or she must be concerned with the economic, ecologic and human factors involved in the problem. Finally, current research topics frequently require a thorough knowledge of advanced mathematics and physics.

The new curriculum of the Electrical Engineering Department reflects the diverse requirements cited above. A basic mathematical, physical and engineering sciences foundation is established in the first two years. Once this foundation is established, the large number of electrical engineering courses and the flexibility of the elective system allow a student to specialize or diversify and to prepare for a career either as a practicing engineer or for more theoretically oriented graduate work.

To go along with this freedom, the Department has a system of undergraduate advising. The student is encouraged to discuss his or her program and career plans with his or her advisor in order to get maximum benefit from the new curriculum.

Sophomore Year		I	II
General University Requirements		3	3
MATH	246—Differential Equations		3
MATH	241—Analysis III	4	
PHYS	262, 263—General Physics II, III	4	4
ENES	240—Algorithmic Analysis and Computer Programming	3	
ENES	221—Dynamics	3	
ENEE	204—Systems and Circuits I		3
ENEE	250—Computer Structures		3
	Total Credits	17	16

Junior Year		I	II
MATH	—(Elective Advanced Math)	3	
ENEE	322—Signal and System Theory	3	
ENEE	380—Electromagnetic Theory	3	
ENEE	381—Electromagnet Wave Propagation		3
ENEE	304—Systems and Circuits II	3	
ENEE	305—Fundamental Laboratory	2	
ENEE	324—Engineering Probability		3
ENEE	314—Electronic Circuits		3
ENEE	—Advanced Elective Laboratory		2
Electives*			3
General University Requirements		3	3
	Total Credits	17	17

Senior Year		I	II
ENEE	—Specialty Electives	3	3
Electives*		6	9
General University Requirements		6	3
	Total Credits	15	15

*Of the eighteen elective credits, a minimum of three credits must be from Electrical Engineering and a minimum of nine credits from other fields of engineering, mathematics, physics, or other suitable scientific disciplines. The remaining six credit hours are technical electives, and may be taken from Electrical Engineering or other engineering and technical areas (including mathematics, physics, or other scientific fields).

Technical electives available in Electrical Engineering are described in the course listings. Any Electrical Engineering course numbered 400 or 499 inclusive that is not specifically excluded in its description may be used as part of a technical elective program. All other technical electives must be of 300 level or higher. If a lower level course (not specified as a degree requirement) is prerequisite to a 300 or higher level technical elective, the student should plan to take such a lower level course under his General University Requirements, otherwise, less than 300 level courses do not count as technical electives towards a degree in Electrical Engineering. In all cases the student's elective program must be approved by an Electrical Engineering advisor and, in addition, by the Office of Undergraduate Studies of the Electrical Engineering Department.

Throughout the year students are urged to contact the Electrical Engineering Office of Undergraduate Studies for advice or any other matters related to their studies.

The specialty electives for the six specialization areas are listed below. Students who wish to specialize should plan to take both courses in the same area, plus the specialty laboratory in that area (if one exists). Students not interested in specializing can take any two of the 12 specialty courses listed below and can take two credits of any 400 or higher level laboratory (specialty laboratory or otherwise). Consult departmental offerings each semester or consult the Office of Undergraduate Studies for plans on future offerings of these specialty elective courses.

ENEE Specialty Electives

Circuits:
- ENEE 414—Network Analysis (3)
- ENEE 416—Network Synthesis (3)

Communications:
- ENEE 420—Communication Theory (3)
- ENEE 421—Introduction to Information Theory (3)

Biomedical:
- ENEE 434—Introduction to Neural Networks and Signals (3)
- ENEE 435—Electrodes and Electrical Processes in Biology and Medicine (3)

Computers:
- ENEE 444—Logic Design of Digital Systems (3)
- ENEE 446—Computer Architecture (3)

Control:
- ENEE 460—Control Systems (3)
- ENEE 462—Systems, Control and Computation (3)

Electrophysics:
- ENEE 481—Antenna (3)
- ENEE 496—Introduction to Lasers and Electro-optic Devices (3)

ENEE Advanced Elective Laboratories
- ENEE 407—Microwave-Circuits Laboratory (2)
- ENEE 413—Electronics Laboratory (2)
- ENEE 445—Computer Laboratory (2)
- ENEE 461—Control Systems Laboratory (2)
- ENEE 483—Electromagnetic Measurements Laboratory (2)

An approved laboratory research program (such as ENEE 419 — Apprenticeship) may be substituted for the advanced elective laboratory.

Course Code Prefix—ENEE

Engineering Materials Program

Professor and Program Director: Spain**.
Professors: Armstrong*, Arsenault**, Asimow*, Bolsaitis**, Marcinkowski*.

Engineering materials is the study of the relationship between structure and properties of materials. The principles of physics, chemistry and mathematics are applied to metals, ceramics, polymers and composite materials used in industrial applications. In addition to the traditional area of metallurgy, engineering materials includes the fields of solid state physics and polymer and materials science and their application to modern industrial problems. Because of the extensive use of materials, the engineering student finds a wide variety of interesting career opportunities in many companies and laboratories. Materials research is particularly important in the development of new energy-conversion systems.

Programs of study in engineering materials at the undergraduate and graduate level are offered through the Chemical and Mechanical Engineering Departments. Students may use Engineering Materials as a field of concentration in the Bachelor of Science in Engineering Program. Students choosing engineering materials as their primary field may pursue the following example curriculum. Students electing engineering materials as a secondary field should seek advice from a member of the engineering materials faculty.

Course Code Prefix—ENMA
*Member of Mechanical Engineering Department
**Member of Chemical Engineering Department

Sophomore	Semester I	Semester II
General University Requirements		3
MATH 241—Analysis III	4	
MATH 246—Differential Equations		3
PHYS 262, 263—General Physics	4	4
ENES 220—Mechanics, Materials	3	
CHEM 201, 203—College Chemistry III, IV	3	3
ENES 230—Materials Science	3	
ENME 200—Intro. to Mech. Engineering		3
	17	16
Junior	**I**	**II**
General University Requirements	3	3
CHEM 481, 482—Physical Chemistry	3	3
ENMA 300—Materials Science & Engr	3	
ENMA 301—Materials Eng. Lab	1	
ENMA 462—Deformation of Eng. Matl	3	
ENMA 463—Chemical, Liquid and Powder Process of Eng. Materials		3
ENMA 464—Environmental Effects on Eng. Materials		3
Minor Courses	3	3
Technical Electives		3
	16	18
Senior	**I**	**II**
General University Requirements	6	6
ENMA 470—Structure and Properties of Eng. Materials	3	
ENMA 471—Physical Chemistry of Eng. Materials	3	
ENMA 472—Technology of Eng. Matls		3
ENMA 473—Processing of Eng. Matls		3
Minor Courses	3	3
Technical Electives		3
	15	18

Engineering Sciences

Engineering Science courses represent a common core of basic material offered to students of several different departments. All freshman and sophomore students of Engineering are required to take ENES 101 and ENES 110. Other ENES courses 220, 221, and 240, are specified by the different departments or taken by the student as electives. The responsibility for teaching the Engineering Science courses is divided among the Aerospace, Civil, Mechanical, Chemical and Electrical Engineering Departments. In addition to the core courses noted above, several courses of general interest to engineering or non-engineering students have been given ENES designations.

Fire Protection Engineering Program

Professor and Chairman: Bryan.
Assistant Professor: Hickey.
Lecturers: Brannigan (p.t.), Watts.

Fire protection is concerned with the scientific and technical problems of preventing loss of life and property from fire, explosion and related hazards, and of evaluating and eliminating hazardous conditions.

The fundamental principles of fire protection are relatively well-defined and the application of these principles to a modern industrialized society has become a specialized activity. Control of the hazards in manufacturing processes calls for an understanding not only of measures for the protection but of the processes themselves. Often the most effective solution to the problem of safeguarding a hazardous operation lies in the modification of special extinguishing equipment. The expert in fire protection must be prepared to decide in any given case what is the best and most economical solution of the fire prevention problem. His or her recommendations are often based not only on sound principles of fire protection but on a thorough understanding of the special problems of the individual property.

Modern fire protection utilizes a wide variety of mechanical and electrical equipment which the student must understand in principle before he or she can apply them to special problems. The fire protection curriculum emphasizes the scientific, technical and humanitarian aspects of fire protection and the development of the individual student.

The problems and challenges which confront the specialist in fire protection include the reduction and control of fire hazards due to processes subject to fire or explosion in respect to design, installation and handling, involving both physical and human factors; the use of buildings and transportation facilities to restrict the spread of fire and to facilitate the escape of occupants in case of fire; the design, installation and maintenance of fire detection and extinguishing devices and systems; and the organization and education of persons for fire prevention and fire protection.

Fire Protection Engineering Curriculum

	Semester I	Semester II
Sophomore Year		
General University Requirements	3	3
MATH 240—Linear Algebra		
or		
MATH 241—Analysis III	4	
MATH 246—Differential Equations		3
PHYS 262, 263—General Physics	4	4
ENES 221—Dynamics	3	
ENES 220—Mechanics of Materials		3
ENFP 251—Introduction to Fire Protection Engineering	3	
ENFP 280—Urban Fire Problem Analysis		3
Total	17	16
Junior Year		
General University Requirements	3	3
CMSC 110—Elementary Algorithmic Analysis		
or		
ENES 240—Algorithmic Analysis and Computer Programming	3	
ENME 320—Thermodynamics		
or		
ENCH 295—Chemical Process Thermodynamics		3
ENCE 300—Fundamentals of Engineering Materials		
or		
ENME 300—Materials Science and Engineering		3
ENCE 330—Fluid Mechanics	3	
ENFP 312—Fire Protection Fluids	3	
ENFP 310—Fire Protection Systems Design I		3
ENFP 320—Pyrometrics of Materials	3	
ENFP 321—Functional and Structural Evaluation		3
Approved Electives	2	2
Total	17	17
Senior Year		
General University Requirements	3	6
ENNU 310—Environmental Aspects of Nuclear Energy		
or		
ENEE 300—Principles of Electrical Engineering	3	
ENFP 414—Life Safety Systems Analysis		3
ENFP 411—Fire Protection Hazard Analysis	3	

ENFP	415—Fire Protection System Design II	3	
ENFP	416—Problem Synthesis and Design		3
Technical Electives*		3	3
	Total	15	15

Total Credit Hours — 131

*3 credits of technical electives must be in ENFP

Course Code Prefix—ENFP

Fire Science — Urban Studies

The provision of a major field of specialization in Fire Science for a Bachelor of Science Degree in Urban Studies is designed to meet the professional educational needs and objectives of fire service personnel. The broad interdisciplinary nature of the Urban Studies program will provide public fire safety personnel with a technical background and understanding of urban considerations in public fire safety.

High school seniors interested in the field of fire science are encouraged to enroll in a community college program. The Urban Studies — Fire Science Degree program requires that an individual complete an approved associate degree program in Fire Science. The upper division of a four year program leading to a B.S. in Urban Studies — Fire Science is taken at the College Park Campus.

The upper division fire science courses are structured to build on fundamental concepts developed at the community college level. The primary focus of these courses is the analysis of current technology in fire protection, urban fire service delivery criteria, and research for the improved provision of public fire safety.

Typical Upper Division Program Example

		Semester I	Semester II
Junior Year			
ETFS	301—Fire Safety Codes and Standards	3	
ETFS	302—Urban Fire Safety Analysis I		3
URBS	210—Survey of the Field of Urban Studies		
or			
URBS	260—Introduction to Urban Studies	3	
URBS	320—City and the Developing National Culture		3
Physical Environmental Specialization		3	3
General University Requirements		3	3
General Electives		3	3
		15	15
Senior Year			
ETFS	303—Urban Fire Problem Analysis II	3	
ETFS	402—Fire Safety Research and Transfer		3
URBS	350—Introduction to Urban Field Study		
or			
URBS	395—Seminar in Urban Literature	3	
URBS	430—Urban Community and Urban Organization	3	
URBS	480—Urban Theory and Simulation		3
ETFS	405—Technical Problems Analysis		3
Physical Environmental Specialization		3	3
General University Requirements		3	3
		15	15

Mechanical Engineering

Professor and Chairman: Cunniff.
Professors: Allen, Anand, Armstrong, Asimow, Berger, Dally, Fourney, Hsu, Jackson (Emeritus), Marcinkowski, Sayre, Jr., Shreeve, Jr., Talaat, Weske (Emeritus), Wockenfuss, Yang.
Associate Professors: Buckley, Jr., Hayleck, Jr., Holloway, Marks, Morse, Sallet, Walston.
Assistant Professors. Hurdis, Kirk, Kobayashi, Matthew, Metcalf, Owens, Ostrowski, Tsui, Wallace.
Lecturers: Christou (p.t.), Codes (p.t.), Collier, Dawson (p.t.), Liebowitz (p.t.), Smith.
Instructor: Keydel.
Visiting Professors: Irwin (p.t.), Seigel.
Visiting Assistant Professors: Sadananda, Wu.

The primary function of the mechanical engineer is to create devices, machines, structures or processes which are used to advance the welfare of mankind. Design, analysis and testing are the essential steps in these developments. Of particular importance are the aspects of engineering science and art relating to the generation and transmission of mechanical power, the establishment of both experimental and theoretical models of mechanical systems, the static and dynamic behavior of fluids and the optimization of materials in design. Emphasis is also given to the proper co-ordination and management of facilities and personnel to achieve a successful product or service.

The responsibility of the Mechanical Engineering profession is extremely broad. The following divisions of the American Society of Mechanical Engineers indicate many of the technical areas in which the mechanical engineer may work: air pollution, applied mechanics, automatic controls, aviation and space, biomechanical and human factors, design engineering, diesel and gas engine power, energetics, fluids engineering, fuels, gas turbine, heat transfer, management, materials handling, metals engineering, nuclear engineering, petroleum, power, pressure vessels and piping, process industries, railroad, rubber and plastics, safety, solar energy, textiles and underwater technology.

There are many career opportunities in all of these fields. In particular, the areas of design, systems analysis, management, consulting, research, maintenance, production, teaching and sales offer challenging and rewarding futures.

Because of the wide variety of professional opportunities available to the mechanical engineer, the curriculum is designed to provide the student with a thorough training in basic fundamentals including physics, chemistry, mathematics, mechanics, thermodynamics, materials, heat transfer, electronics, power and design. The curriculum leads to a Bachelor of Science degree in Mechanical Engineering which is usually sufficient for early career opportunities in industry or the government. Advanced graduate programs are available for continued study leading to Master of Science and Doctor of Philosophy degrees.

		Semester I	Semester II
Sophomore Year			
General University Requirements		3	3
MATH	241—Analysis III	4	
MATH	246—Differential Equations		3
PHYS	262, 263—General Physics II, III	4	4
ENES	220—Mechanics of Materials	3	
ENES	221—Dynamics		3
ENME	200—Introduction to Mechanical Engineering	3	
ENME	216—Thermodynamics I		3
	Total	17	16

		Semester I	Semester II
Junior Year			
General University Requirements		3	6
ENEE	300—Principles of Electrical Engineering	3	
ENEE	301—Electrical Engr. Lab	1	
ENME	300—Materials Engineering		3
ENME	301—Materials Engr. Lab		1
ENME	321—Transfer Processes		3
ENME	342—Fluid Mechanics I	3	
ENME	343—Fluid Mechanics Lab	1	
ENME	360—Dynamics of Machinery	3	
ENME	381—Measurements Laboratory		3
ENME	382—Engr. Anal. and Computer Programming	3	
	Total	17	16

Senior Year		Semester I	Semester II
General University Requirements		3	3
ENME	400—Machine Design	3	
ENME	401—Mechanical Engineering Analysis and Design		4
ENME	421—Energy Conversion I	3	
ENME	480—Engineering Experimentation		3
Technical Elective		*6	*6
Total		15	16

*Except with the special permission of the Department Chairman, the students will be required to take 9 of the elective credits in the Engineering College, 6 of which must be in the Mechanical Engineering Department.

Technical Electives

ENME	403—Automatic Controls	3
ENME	410—Operations Research I	3
ENME	411—Introduction to Industrial Engineering	3
ENME	414—Solar Energy — Applications in Buildings	3
ENME	422—Energy Conversion II	3
ENME	423—Environmental Engineering	3
ENME	424—Advanced Thermodynamics	3
ENME	442—Fluid Mechanics II	3
ENME	450—Mechanical Engineering Analysis for the Oceanic Environment	3
ENME	451—Mechanical Engineering Systems for Underwater Operations	3
ENME	452—Physical and Dynamical Oceanography	3
ENME	453—Ocean Waves, Tides and Turbulences	3
ENME	460—Elasticity and Plasticity I	3
ENME	461—Dynamics II	3
ENME	462—Introduction to Engineering Acoustics	3
ENME	465—Introductory Fracture Mechanics	3
ENME	488—Special Problems	3
ENME	489—Special Topics in Mechanical Engineering	3

In the Mechanical Engineering Department there are several divisions of specialization which include: design and system analysis, energy conversion, solid and fluid mechanics and materials. The undergraduate student may select technical electives from one or more of these areas of specialization. Students planning to continue on in the graduate program should preferably choose electives to provide the best background for their major area. The subject material of interest to each field of specialization is:

I. Industrial and Systems Engineering
   a. Systems design
   b. Systems analysis
   c. Operations research
   d. Engineering management
II. Energy
   a. Thermodynamics
   b. Heat transfer
   c. Energy conversion
   d. Solar energy
III. Fluid Mechanics
   a. Compressible and incompressible flow
   b. Viscous flow
   c. Hydrodynamics
   d. Marine and ocean engineering
IV. Solid Mechanics
   a. Continuum mechanics
   b. Dynamics, vibrations and acoustics
   c. Elasticity, plasticity and viscoelasticity
   d. Plates, shells and structures
   e. Experimental mechanics
V. Materials
   See listing under Engineering Materials section.

Opportunities are also available for students to take advanced work in engineering management, operations research, marine and ocean engineering, bio-mechanical engineering, environmental engineering, acoustics, bio-mechanics and experimental stress analysis.

Course Code Prefix—ENME

Mechanical Engineering Technology Program

Mechanical Engineering is a part of the spectrum of technical education extending from the skilled craftsman to the professional mechanical engineer. The mechanical engineering technologist is located nearest the engineer and applies scientific and engineering principles in supporting engineering activities in both government and industries. Students completing this program normally pursue their careers as engineering technologists working in production, maintenance, quality control, prototype testing or sales.

High school seniors interested in Mechanical Engineering Technology are encouraged to enroll in a community college program. The community colleges provide the first two years of the program and award students an Associate of Arts degree. The second two years of a four year program leading to a B.S. in Mechanical Engineering Technology are taken at the College Park Campus.

Mechanical Engineering Technology Curriculum

Junior Year		Semester I	Semester II
CMSC	110—Introduction to Computer Programming	3	
ENME	380—Applied Math in Engineering	3	6
ETME	210—Applied Thermodynamics	3	
ETME	320—Fluid Mechanics Technology	3	
ENME	343—Fluid Mechanics Laboratory	1	
ETME	330—Machine Design Technology I	3	
General University Requirements		3	3
ETME	325—Instrumentation & Measurements		4
ETME	335—Machine Design Technology II		3
ETME	315—Heat Transfer Technology		3
ETME	345—Vibrations		3
Total		16	16

Senior Year		Semester I	Semester II
ETME	350—Mechanical System Design	3	
ETME	370—Industrial Engineering Tech	3	
ETME	360—Applications of Direct Energy Conversion	3	
ETME	—Technical Elective	3	
General University Requirements		3	3
ETME	355—Mechanical System Design Project		3
ETME	375—Applied Operations Research		3
ETME	—Technical Elective		3
ETME	—Technical Elective		3
Total		15	15

*Students transferring equivalent course as part of their first two years credits may make appropriate substitutions. It is strongly recommended that students complete thermodynamics before entering the junior year. If this is not feasible, they must take ETME 210 during the first semester. It is recommended that students complete an equivalent computer programming course before starting the junior year. Students who have not taken computer programming by the end of their junior year must take programming in lieu of a technical elective.

Nuclear Engineering Program

Professor and Program Director: Munno.
Professors: Duffey, Johnson, Silverman.
Associate Professors: Almenas, Roush,* Sheaks.
Assistant Professor: Blair.
Part-Time Professor: Goldman.
Lecturers: Belcher, Salah.
*Joint appointment with Physics

Nuclear engineering deals with the practical use of nuclear energy from nuclear fission, fusion, and radioisotope sources. The major use of nuclear energy is in electric power generation. Other uses are in the areas of chemical processing, medicine, instrumentation, and isotope tracer analysis. The

nuclear engineer is primarily concerned with the design and operation of energy conversion devices ranging from very large reactors to miniature nuclear batteries, and with the use of nuclear reactions in many environmental, biological and chemical processes. Because of the wide range of uses for nuclear systems, the nuclear engineer finds interesting and diverse career opportunities in a variety of companies and laboratories.

Programs of study in nuclear engineering at the undergraduate and graduate level are offered through the Chemical Engineering Department. Students may use nuclear engineering as a field of concentration in the Bachelor of Science in Engineering Program.

Students choosing nuclear engineering as their primary field may pursue the following example curriculum. Students electing nuclear engineering as their secondary field should seek advice from a member of the nuclear engineering faculty.

Nuclear Engineering Program

		Semester I	Semester II
Sophomore Year			
General University Requirements		3	3
MATH	240—Linear Algebra	4	
MATH	246—Differential Equations		3
PHYS	262, 263—General Physics	4	4
ENES	221—Dynamics	3	
ENES	240—Algorithmic Analysis and Computer Programming		3
Secondary Field Electives		3	
ENNU	215		3
	Total	17	16
Junior Year			
General University Requirements		3	6
ENNU	440—Nuc. Tech. Lab	3	
ENNU	450—Reactor Eng. I	3	
PHYS	421—Intro. to Mod. Phys	3	
Secondary Field Courses		3	3
ENNU	455—Reactor Engr. II		3
ENNU	460—Nuc. Heat Trens		3
ENES	Elective		3
	Total	15	18
Senior Year			
General University Requirements		3	3
ENNU	Electives	3	3
Secondary Field Courses		3	3
Technical Electives		3	3
ENNU	480—Reactor Core Des	3	
ENNU	490—Nuc. Fuel Cycle & Management		3
ENES	Elective	3	
	Total	18	15

Wind Tunnel Operations Department

Wind Tunnel Operations Department conducts a program of experimental research and development in cooperation with the aircraft industry, agencies of government and other industries with problems concerning aerodynamics. Testing programs cover a variety of subjects including all types of aircraft, ships, parachutes, radar antennas, trucks, automobiles, structures, and exterior equipment subject to high winds.

The Department has a 7.75x11-foot wind tunnel that can be operated at speeds from 0 to 240 mph. This facility has powered model drive equipment, and auxiliary vacuum and high pressure air supplies for boundary layer control studies. Supporting shops include complete woodworking, machine shop, photographic, and instrumentation facilities.

The full-time staff of the department includes engineering, computing, shop, and technical operations personnel. This staff cooperates with other faculty and students in the College of Engineering on problems of mutual interest.

Other Mathematical and Physical Science Departments, Programs and Curricula

Applied Mathematics Program

Director: Professor W. Rheinboldt
Faculty: Seventy-four members from eleven units of the campus.

The Interdisciplinary Applied Mathematics Program provides the opportunity for graduate study and research in mathematics and its applications in the engineering, physical and social sciences.

The faculty of the program includes members from the following participating units: Departments of Aerospace Engineering, Chemical Engineering, Civil Engineering, Computer Science, Economics, Electrical Engineering, Mathematics, Mechanical Engineering and Physics and Astronomy, College of Business and Management, Institute for Fluid Dynamics and Applied Mathematics.

The purpose of the program is to encourage the development of expertise in both mathematics and a particular field of appreciation.

For admission to the Interdisciplinary Applied Mathematics Program, a student is expected to have completed an undergraduate program which included a strong emphasis on mathematics. A good background in some part of an applications area, such as the basic sciences, engineering, economics, business and management, etc. is also highly recommended. In addition, undergraduate students interested in preparing themselves for graduate study under the program are urged to acquire a good foundation in scientific computing.

Astronomy Program

Professor and Chairman of Physics and Astronomy: Dragt.
Professor and Director of Astronomy: Kerr.
Professors: Brandt (p.t.), Erickson, Kundu, Opik (p.t.), V. P. Smith, Wentzel, Westerhout.
Associate Professors: A'Hearn, Bell, Clark (p.t.), Harrington, Matthews, Rose, Trimble (p.t.), Zipoy, Zuckerman.
Visiting Assistant Professor: Chen.
Lecturers: Altschuler, Deming.

The Department of Physics and Astronomy offers a major in Astronomy. The Astronomy Program office is located in the Space Sciences Building. Astronomy students are given a strong undergraduate preparation in astronomy, physics and mathematics, as well as encouragement to take a wide range of other liberal arts courses. The Astronomy Program is designed to be quite flexible, in order to take advantage of students' special talents or interests after the basic requirements for a sound astronomy education have been met. Students preparing for graduate studies will have an opportunity to choose from among many advanced courses available in astronomy, mathematics and physics. The program is designed to prepare students for positions in governmental and industrial laboratories and observatories, for graduate work in astronomy or related fields, and for non-astronomical careers such as in law or business.

Students intending to major in astronomy who have a high school course in physics and who have adequate preparation in mathematics to qualify for admission to MATH 140 will ordinarily take the introductory physics course PHYS 191, 192, 293 and 294 during their freshman and sophomore years. Those students who do not decide to major in astronomy or physics until after their

freshman or sophomore year or enter as transfer students will often have taken other introductory courses in physics (e.g. PHYS 161, 262, 263). Students will find further details in the pamphlet entitled Department Requirements for a B.S. degree in Astronomy, which is available from the Astronomy Program Office. This pamphlet outlines many different approaches for an astronomy major.

ASTR 181, 182 (Introductory Astronomy and Astrophysics) is the introductory astronomy course required of astronomy majors. It may be taken in the freshman or sophomore year. It is followed by another required course, ASTR 210 (Practical Astronomy). Some students may not decide to major in astronomy until they have already taken ASTR 100 and 105 (Introduction to Astronomy and Modern Astronomy). Such students should, as a rule, still fulfill the ASTR 181, 182 requirement; only students with a grade of B or better in ASTR 100 and 105 will be encouraged to major in astronomy. For those students with the appropriate physics background, it would be preferable to take a one semester introductory course, ASTR 350, instead of the ASTR 181, 182 sequence.

Astronomy majors are required to take the following physics courses: PHYS 191, 192, 195, 196, 293, 294, 295 and 296 (161, 262, 263 plus 404-405 may be substituted for this sequence in some cases). In addition, one of the following sequences is required: PHYS 421-422 or 410-411. Required supporting courses are MATH 140, 141 and 240 or 241 or 246. The introductory astronomy courses, ASTR 181, 182 (or ASTR 350) and 210 plus any two 400-level ASTR courses (6 credits) complete the requirements. The program requires that the student maintain an average grade of C in all astronomy courses; moreover, the average grade of all the required physics and mathematics courses must also be C or better. Any student who wishes to be recommended for graduate work in astronomy must maintain a B average. He or she should also consider including several additional advanced courses, beyond the minimum required, to be selected from astronomy, physics and mathematics.

Honors in Astronomy. The Honors Program offers students of exceptional ability and interest in astronomy an educational program with a number of special opportunities for learning. There are many opportunities for part-time research participation which may develop into full-time summer projects. An honors seminar is offered for advanced students; credit may be given for independent work or study; and certain graduate courses are open for credit toward the bachelor's degree.

Students for the Honors Program are accepted by the Department's Honors Committee on the basis of recommendations from their advisors and other faculty members. Most honors candidates submit a written report on their research project, which together with an oral comprehensive examination in the senior year, concludes the program which may lead to graduation "with Honors (or High Honors) in Astronomy."

Courses for Non-Science Majors. There are a variety of Astronomy courses offered for those who are interested in learning about the subject but do not wish to major in it. These courses do not require any background in mathematics or physics and are geared especially to the non-science major. ASTR 100 is a general survey course that briefly covers all of the major parts of Astronomy. ASTR 110 is the lab that can be taken with or after ASTR 100. Several 300-level courses are offered primarily for non-science students who want to learn about a particular field in depth. In ASTR 398 the subject matter will change each semester and will cover such topics as: Life in the Universe, Our Milky Way Galaxy, the New Astronomy. As a rule, 398's, like ASTR 330 (solar system) and ASTR 340 (galaxies and the universe), have no prerequisites beyond junior standing.

Center of Materials Research

Director: Robert L. Park.
Advisory Committee: R. J. Arsenault, I. Adler, R. Ferrell, and R. Zwanzig.

The Center of Materials Research is an interdepartmental organization which has as its function the support of research and education in the field of materials science. The principal constraints on every major technological undertaking of society are imposed by materials problems. The objective of the University of Maryland's Center of Materials Research is to lessen these constraints through a vigorous program in materials research. Support for this program consists of funds for the aid of graduate students working towards advanced degrees, post-doctoral research appointments, the granting of research support to university faculty working in the materials sciences and the purchases of capital equipment needs for graduate students or faculty research programs. It also operates service and research facilities which are shared jointly by graduate students and faculty from several departments.

The scientific management of this program rests solely within the University through the Director of the Center of Materials Research assisted by an Advisory Committee. Faculty participating in the program represent the departments of Chemical Engineering, Chemistry, Electrical Engineering, Mechanical Engineering, Physics, and the independent research institutes.

Funds for the Center come from both University and government sources, the largest single source being the National Science Foundation. Members obtain NSF support for their research when their proposals to the Center of Materials Research are approved by the CMR Committee and the Director.

Areas of research activity include high pressure phenomena; intermolecular interactions; spectra and structural studies; electronic and mechanical properties of materials; interaction of radiation with materials; characterization of materials; neutron scattering and diffraction; surface phenomena and phase transitions.

The CMR provides central facilities containing the most modern available instrumentation for use by participating members of the Center. The facilities include: X-Ray Diffraction, Photoelectron and Molecular Spectroscopy; Scanning and Transmission Electron Microscopes, Tunable Lasers; and High Field Superconducting Magnet.

Computer Science

Professor and Chairman: Minker.
Professors: Atchison, Chu[1], Edmundson[2], Heilprin[3], Kanal, Rheinboldt[4], Rosenfeld[5].
Visiting Professor: H. Mills (p.t.).
Associate Professors: Austing, Basili, Stewart[6], Vandergraft, Zelkowitz.
Assistant Professors: Agrawala, Gannon, Hagerty[5], Hamlet, Hecht, Kim, McClellan, D. Mills, Noonan, Rieger, Samet, Smith.
Instructors: Menard[7], Underwood (p.t.), VanderBrug.

[1]Jointly with Electrical Engineering
[2]Jointly with Mathematics
[3]Jointly with College of Library and Information Services
[4]Also Director, Applied Mathematics Program
[5]Jointly with Computer Science Center
[6]Jointly with the Institute for Fluid Dynamics and Applied Mathematics
[7]Also Director, Computer Science Center

The Department of Computer Science offers a B.S. degree in Computer Science. The program is designed to meet the three broad objectives of service to the community, qualification for employment, and preparation for graduate work. It provides the student with the flexibility to select courses in areas of individual interest and in line with the student's goals after graduation.

Requirements for a Computer Science Major. The course of study for each Computer Science major must include at least 30 credit hours of CMSC courses with an overall average of C or better. All CMSC courses are counted in the major. A minimum of 24 of the 30 credit hours must be at the 300-400 levels.

Each student's program must satisfy the General University Requirements (30 credit hours). No CMSC course or specified prerequisite of a CMSC course may be counted toward these requirements.

Additional courses as electives must be completed to obtain the minimum 120 credit hours required for graduation. Students may wish to choose their electives to satisfy the requirements of another department's degree program and, by so doing, qualify for a double major.

Introductory Computer Science Courses. The Department offers a choice of courses, CMSC 103, 110, for students with little or no computer background.

CMSC 103 is considered a terminal course for non-majors. It provides an introduction to the use of a computer and programming in the language FORTRAN. Students who complete CMSC 103 but want to take additional CMSC courses should contact an advisor as soon as possible to determine what additional work may be necessary to qualify for CMSC 120.

Non-majors who may want to take additional CMSC courses should take CMSC 110 instead of CMSC 103. The two courses are of comparable difficulty, and the material is similar. As a terminal course, CMSC 103 attempts to cover more topics but at less depth than CMSC 110.

Majors should take the CMSC 110, 120 sequence in their first year. Those students who have programming background in a language such as FORTRAN should consult an advisor to determine if they need to take CMSC 110 or if they could obtain credit for it by examination. Credit by examination is possible for CMSC 110 or 120, or for any other undergraduate level computer science course for which transfer credit has not been given.

Undergraduate Computer Science Courses. Beginning with courses at the 200 level, each student may arrange an individualized program by choosing areas of interest within computer science and then taking courses appropriate to those areas. The Department offers the following undergraduate courses in the areas indicated: Applications: CMSC 280, 475, 477, 480; Computer Systems: CMSC 210, 410, 415; Information Processing: CMSC 220, 420; Numerical Analysis: CMSC 270, 460, 470; Programming Languages: CMSC 440, 445; and Theory of Computing: CMSC 250, 450, 452, 455.

In addition, special topics courses (CMSC 498) are offered in one or more areas each semester. (Graduate level courses are offered in all of these areas as part of the Department's M.S. and Ph.D. degree programs.)

The student may choose from a large variety of computer science courses to satisfy the requirement of a minimum of 30 credit hours of CMSC courses. Although there are currently no requirements for specific courses outside of the major, a proposal to require MATH 140 and MATH 141 is pending approval. A number of advanced courses in computer science have additional mathematics such as MATH 240 and 241 as prerequisites. Students who anticipate continuing their studies in graduate school should complete the sequence MATH 140, 141, 240, 241.

Sample Programs. The following sample programs are included to indicate the variety of programs that are possible.

AREA–Applications (Scientific); *CMSC COURSES*–220, 280, 420, 450, 470, 471, 475, 477, 480, 498; *ELECTIVES*–MATH 140, 141, 240, 241, 474, STAT 400.

AREA–Applications (Business); *CMSC COURSES*–210, 220, 250, 410, 415, 420, 440, 445, 455, 498, 498; *ELECTIVES*–MATH 140, 141, 240, IFSM 401, 402, Additional IFSM courses.

AREA–Applications (Societal), *CMSC COURSES*–210, 220, 250, 410, 415, 420, 440, 445, 455, 480, 498, *ELECTIVES*–MATH 140, 141. Additional courses from departments such as BIOL, ECON, GVPT, PSYC, SOCY

AREA–Computer Systems, *CMSC COURSES*–210, 220, 410, 415, 420, 440, 445, 452, 455, 498, *ELECTIVES*–MATH 140, 141, 240, 241, STAT 400, ENEE 444 456. Additional ENEE courses.

AREA–Information Processing: *CMSC COURSES*–210, 220, 250, 410, 420, 440, 445/415, 450, 470/475, 498, 498; *ELECTIVES*–MATH 140, 141, 240, 241, STAT 400, IFSM 401, 402. Additional IFSM courses.

AREA–Numerical Analysis, *CMSC COURSES*–220, 420, 440, 450, 470, 471, 475, 477, 498, *ELECTIVES*–MATH 140, 141, 240, 241, 405, 410. Additional MATH and STAT courses

AREA–Programming Languages, *CMSC COURSES*–210, 220, 410, 415, 420, 440, 445, 450, 452, 498; *ELECTIVES*–MATH 140, 141, 240.

AREA–Theory of Computing: *CMSC COURSES*–210, 250, 410, 415/445, 440, 450, 452, 455, 475/477, 498, *ELECTIVES*–Math 140, 141, 240, 241. Additional MATH and STAT courses.

Honors Program. A departmental honors program is being developed and is expected to be available by the end of the 1975/76 academic year. Information about this program will be available in the Education Office of the Department.

Computer Equipment. The Department maintains a minicomputer laboratory for instruction and research. Currently, the laboratory contains a PDP 11/40 and two PDP 11/45 computer systems. Students in advanced CMSC courses have the opportunity to gain hands-on experience through the use of these facilities and become involved in the development and modification of systems through programming. In addition, students use the UNIVAC 1108/1106 computer system with remote units which are maintained by the Computer Science Center for all educational and research activities of the Campus.

Course Code Prefix—CMSC

Fluid Dynamics and Applied Mathematics

Professor and Acting Director: Landsberg.
Professors: Babuska, Brush[2], Crane, DeClaris[3], Dorfman[4], Faller, Hubbard, Israel[5], Jones, Karlovitz, Kellogg, Koopman, Lashinsky, Olver, Pai, Rosenberg, Tidman, Weiss[3], Wilkerson, Wu, Yorke, Zwanzig.
Professors (Visiting or Part-Time): Aziz[1], Bhatia[1], Northrop, Fritz.
Associate Professors: Coplan, Guernsey, McIlrath, Matthews, Rodenhuis, Stewart[6], Thompson, Vernekar.
Associate Professors (Visiting or Part-Time): Ogilvie, Sakurai, Miller.
Assistant Professors: Cheung[8], Ellingson, Johnson.
Assistant Professors (Visiting or Part-Time): Li, Soong, Taylor.
Visiting Lecturers: Bonner, Bromberg, Gruber, Piacsek.
Professors Emeritus: Burgers, Elsasser, Martin.
Instructor (Part-Time): Pinker.

[1]Joint with University of Maryland Baltimore County
[2]Joint with History
[3]Joint with Electrical Engineering
[4]Joint with Physics and Astronomy
[5]Joint with Civil Engineering
[6]Joint with Computer Science Department
[7]Joint with Economics
[8]Joint with Radiology University of Maryland School of Medicine

The faculty of the Institute for Fluid Dynamics and Applied Mathematics works on multidisciplinary and applied science problems which afford challenging opportunities for thesis research and classroom instruction. A graduate program to the Ph.D. level is offered in meteorology.* Other courses and thesis research guidance by the faculty of the Institute are provided either through the graduate program in applied mathematics or under the auspices of other departments. Students interested in studying with Institute faculty members should direct inquiries to the Director, IFDAM, College Park, Maryland 20742.

The Institute's areas of interest include both experimental and theoretical work. Current topics of interest are: atomic physics, a wide variety of problems in plasma physics, statistical mechanics of physical and living systems, physics of the upper atmosphere and magnetosphere, fluid dynamics, physical oceanography, various aspects of space and planetary science, theoretical and applied numerical analysis, control theory, epidemiology and biomathematics, and history of science. They also include analysis of a number of current problems of interest to society such as mathematical models applied to public health, and many diverse efforts in basic mathematics.

The Meteorology Program features a number of research areas including climatology, air pollution, atmospheric phenomena in the tropics, optical properties of the atmosphere, micrometeorology and dynamics of the atmosphere.

The Institute sponsors a wide variety of seminars in the various fields of its interest. Principal among these are the general seminars in plasma physics, meteorology, applied mathematics, fluid dynamics, and in atomic and molecular physics. Information about these can be obtained by writing the director or by calling (301) 454-2636.

Financial support for qualified graduate students is available through research assistantships funded by grants and contracts, and through teaching assistantships in related academic departments.

*See the seperate listing for the Meteorology Program.

Mathematics

Professor and Chairman: Goldhaber.
Professors: Adams, Antman, Auslander, Babuska***, Benedetto, Bernstein, Brace, Chu, Correl, Douglis, Edmundson*, Ehrlich, Goldberg, Goldstein, Good, Gray, Greenberg, Gulick, Heins, Horvath, Hubbard***, Hummel, Jackson, Karlovitz***, Kellogg***, Kirwan, Kleppner, Lehner, Lipsman, Lopez-Escobar, Mikulski, Olver***, Osborn, Pearl, Reinhart, Rheinboldt, Stellmacher, Strauss, Syski, Vesentini, Wolfe, Zalcman, Zedek.
Associate Professors: Alexander, Berg, J. Cohen, Cook, Cooper, Dancis, Ellis, Fey**, Green, Helzer, Henkelman**, Johnson, Lay, Markley, Neri, Owings, Sather, Schafer, Schneider, Stewart, Sweet, Warner, Yang.
Assistant Professors: Berenstein, Cooke, Currier, Davidson**, Fitzpatrick, Garbanati, W. Hill, Kedem, Kirby, Kueker, Lee, Liu, Mucci, Neumann, Niebur, Razar, Schmidt, Shepherd, Smith, Winkelnkemper.
Professor Emeritus: L. Cohen.
Instructors: Brown (p.t.), Hildenbrand, Kilbourn, Lepson, McClay, Steely, Vanderslice (p.t.), Wagner.
Instructor and Administrative Assistant: Sorensen.

*Joint Appointment Computer Science Center
**Joint Appointment Department of Secondary Education
***Joint Appointment IFDAM

The program in mathematics leads to a degree of Bachelor of Science in Mathematics, and offers students training in mathematics and statistics in preparation for graduate work, teaching and positions in government or industry.

A student intending to major in mathematics should complete the introductory sequence MATH 140, 141, 240, 241 or the corresponding honors sequence MATH 150, 151, 250, 251 and should have an average grade of at least B in these courses.

A mathematics major is required to complete MATH 410, 411, either 403 or 402 and five other upper division courses (24 credits). A linear algebra course is also required and this requirement may be satisfied by one of the following: MATH 240, 400, 405 or 474. A grade of C or better must be presented for each course used to meet the MATH/STAT major requirements.

The requirements are detailed in a departmental brochure which is available through the Undergraduate Mathematics Office. Appropriate courses taken at other universities or through University College may be used to fulfill these requirements, but at least four of the eight required upper division MATH/STAT courses must be taken in the Department of Mathematics.

In addition to the above, a mathematics major must include at least 10 credit hours of science supporting course work with a grade average of at least C. A list of approved science sequences may be obtained from the Mathematics Undergraduate Office.

Within the Department of Mathematics there are a number of identifiable areas which a student can pursue to suit his/her own goals and interests. They are briefly described below. Note that they do overlap and that a student need not confine himself/herself to one of them.

1. Pure Mathematics: the courses which clearly belong in this area are: MATH 402, 403, 404, 405, 406, 410, 411, 413, 414, 415, 416, 417, 430, 431, 432, 433, 436, 444, 446, 447, 450. Students preparing for graduate school in mathematics should include MATH 403, 404 or 405, 410, 411, 413 (or 660), and 432 (or 730) in their programs. Other courses from the above list and graduate courses are also appropriate.

2. Secondary teaching: the following courses are particularly suited for students preparing to teach mathematics at the secondary level: MATH 402, 406, 430, 431, 444, 450, STAT 400, and EDSE 372. (EDSE 372 is acceptable as one of the eight upper level math courses required for a mathematics major.) In addition, EDHD 300, EDSF 301, EDSE 350, and 330 are necessary to teach. Immediately after completing at least 42 credits, you must apply for and be admitted to teacher education.

3. Statistics: for a student with a B.A. seeking work requiring some statistical background, the minimal program is STAT 400-401. To work primarily as a statistician, one should combine STAT 400-401 with at least one more statistics course, most suitably STAT 450. A stronger sequence is STAT 410, 420, 450. This offers a better understanding and wider knowledge of statistics and is a general purpose program (i.e., does not specify one area of applications). For economics applications STAT 400, 401, 450, 477 should be considered. For operations research STAT 477 and/or 411 should be added or perhaps substituted for STAT 450. To prepare for graduate work, STAT 410 and 420 give the best background, with STAT 411, 421, 450 and 477 added at some later stage.

4. Computational mathematics: there are a number of math courses which emphasize the computational aspects of mathematics including the use of the computer. They are MATH 460, 470, 472, 474, 475, and 477. Students interested in this area should take CMSC 110 as early as possible, and CMSC 210, 420, 440 are also suggested.

5. Applied mathematics: the courses which lead most rapidly to applications are the courses listed above in 3 and 4 and MATH 401, 414, 415, 462, 463, 464. A student interested in applied mathematics should obtain, in addition to a solid training in mathematics, a good knowledge of at least one area in which mathematics is currently being applied. Concentration in this area

is good preparation for employment in government and industry or for graduate study in applied mathematics.

Language. Since most of the non-English mathematical literature is written in French, German or Russian, students intending to continue studying mathematics in graduate school should obtain a reading knowledge of at least one of these languages.

Honors in Mathematics. The Mathematics Honors Program is designed for students showing exceptional ability and interest in mathematics. Its aim is to give a student the best possible mathematical education. Participants are selected by the Departmental Honors Committee during the first semester of their junior year. To graduate with honors in mathematics they must take four credits of MATH 398 and pass a final written and oral comprehensive examination. A graduate course of three credits of independent study may be substituted for two credits of MATH 398. The rest of the program is flexible. Independent work is encouraged and can be done in place of formal course work. A student need not major in mathematics to participate in the honors program.

The Mathematics Department also offers a special Mathematics Departmental honors calculus sequence (MATH 150, 151, 250, 251) for promising freshmen with a strong mathematical background (usually including calculus). Enrollment in the sequence is normally by invitation but any interested student may apply to the Mathematics Departmental Honors Committee for admission.

Participants in the General Honors Program may enroll in special honors sections of the regular calculus sequence (MATH 140H, 141H, 240H, 241H). They may enroll in the honors calculus sequence if invited by the Mathematics Departmental Honors Committee. However, the Mathematics Departmental Honors calculus sequence and the General Honors Program are distinct, and enrollment in one does not imply acceptance in the other.

Neither honors calculus sequence is prerequisite for participating in the Mathematics Honors Program, and students in these sequences need not be mathematics majors.

Pi Mu Epsilon. The local chapter of Pi Mu Epsilon, national honorary mathematics fraternity, meets frequently to discuss mathematical or educational topics of interest to undergraduates. The programs are open to the public.

Placement in Mathematics Courses. The department has a large offering to accommodate a great variety of backgrounds, interests and abilities. The department permits a student to take any course for which he or she has the appropriate background regardless of formal course work. For example, a student with a high school calculus course may be permitted to begin in the middle of the calculus sequence even if he or she does not have advanced standing. Students may obtain undergraduate credit for mathematics courses in any of the following ways: passing the appropriate CEEB Advanced Placement Examination, passing standardized CLEP examinations, and through the department's Credit-by-Examination. Students are urged to consult with advisors from the Mathematics Department to assist with proper placements.

Statistics and Probability. Courses in statistics and probability are offered by the Department of Mathematics. These courses are open to non-majors as well as majors, and carry credit in Mathematics. Students wishing to concentrate in statistics may do so by choosing an appropriate program under the Department of Mathematics.

Course Code Prefixes—MATH, STAT

Meteorology Program

Professor and Director: (To be announced).
Professors: Faller, Israel*.
Professor Emeritus: Landsberg.
Associate Professors: Rodenhuis, Thompson, Vernekar.
Assistant Professor: Ellingson.
Visiting Assistant Professors: Li, Soong, Taylor.
Instructor: Pinker.
Lecturers: Bonner (p.t.), Fritz (p.t.), Gruber (p.t.), Piascek (p.t.).
*Joint appointment with Civil Engineering

The program in Meteorology, part of the Institute for Fluid Dynamics and Applied Mathematics, offers a number of courses of interest to undergraduate students. These courses provide an excellent undergraduate background for those students who wish to do graduate work in the fields of atmospheric and oceanic science, meteorology, air pollution, and other environmental sciences. The interdisciplinary nature of studies in meteorology and physical oceanography assures that all science oriented students will gain a broadened view of physical science as a whole, as well as the manner in which the sciences may be applied to understand the behavior of our environment.

Undergraduate students interested in pursuing a bachelors degree program preparatory to further study or work in meteorology are urged to consider the Physical Sciences Program, in which they can specialize in meteorology. It is important that students who anticipate this specialization should consult the Physical Sciences Program advisor representing the Meteorology Program as early as possible in their studies.

Because of its interdisciplinary nature, the study of the atmosphere requires a firm background in the basic sciences and mathematics. To be suitably prepared for 400-level courses in meteorology, the student should have the following background: Either the physics major series PHYS 191-296 or the series PHYS 161, 262, 263; the mathematics series MATH 140, 141, 240, 241 and either the series CHEM 103, 104 or CHEM 105, 106. In addition, natural science background courses in astronomy (such as ASTR 181, 182, or 350), geology (such as GEOL 445, 446) and METO 301 are highly recommended.

Electives in meteorology are:

METO	301—Atmospheric Environment	3
METO	398—Topics in Atmospheric Science	3
METO	410—Descriptive and Synoptic Meteorology I	3
METO	411—Descriptive and Synoptic Meteorology II	3
METO	412—Physics and Thermodynamics of the Atmosphere	3
METO	413—Atmospheric Processes on Atomic and Molecular Scale	3
METO	416—Introduction to Atmospheric Dynamics	3
METO	420—Physical and Dynamical Oceanography	3
METO	422—Oceanic Waves, Tides and Turbulence	3
METO	434—Air Pollution	3
METO	441—Weather Map Discussion and Practice Forecasting I	1
METO	442—Weather Map Discussion and Practice Forecasting II	1
METO	499—Special Problems in Atmospheric Science	1-3

Students who may be preparing for graduate education in meteorology are strongly advised to pursue further course work from among the areas of physics, mathematics, chemistry, computer science and statistics to supplement course work in meteorology.

Molecular Physics

Professor and Director: Benesch.
Professors: Benedict, DeRocco, Ginter, Krishner, Sengers, Zwanzig[1].
Visiting Professor: Tilford.
Visiting Associate Professor: Dick (p.t.).
Assistant Professor: Gammon.
[1]Joint with Fluid Dynamics

The Institute for Molecular Physics serves as an ideal place to bring together physicists, chemists, engineers, atmospheric scientists, etc. to work on problems of mutual interest to the advantage of both. The graduate degree program in Chemical Physics is administered jointly by the Institute and the Chemistry and Physics Departments.

The current research activities include theoretical and experimental studies in the broad fields of intermolecular forces (equation of state of liquids and gases, critical phenomena, transport phenomena in gases and plasmas, molecular collisions and scattering processes, biological systems), molecular structure (spectroscopy from the microwave to the vacuum ultraviolet, upper atmospheric and auroral phenomena, solar and planetary atmospheres, potential energy curves, molecular quantum mechanics), chemical and physical kinetics, laser studies, statistical mechanics and biophysics.

This broad range of interests reflects the interdisciplinary nature of both the Institute for Molecular Physics and the Chemical Physics program. All of the faculty members at the Institute are working in scientific areas which did not exist ten years ago. Accordingly, the students who are drawn to the Institute for training and research tend to be those who are interested in problems which lie somewhat outside the more conventional disciplines. The programs are quite flexible with regard to content and pace, and research groups often combine faculty and postdoctoral, graduate, and undergraduate students.

Physical Sciences Program

Chairman: Smith.
Astronomy: Matthews, *Chemistry:* Jaquith, *Computer Science:* Vandergraft, *Geology:* Stifel, *Mathematics:* Schneider, *Meteorology:* Thompson, *Physics:* deSilva, S. Zorn.

Purpose. This program is suggested for many types of students: those whose interests cover a wide range of the physical sciences; those whose interests have not yet centered on any one science; students interested in a career in an interdisciplinary area within the physical sciences; students who seek a broader undergraduate program than is possible in one of the traditional physical sciences; preprofessional students (prelaw, premedical); or students whose interests in business, technical writing, advertising or sales require a broad technical background. This program can also be useful for those planning science-oriented or technical work in the urban field; some of the Urban Studies courses should be taken as electives. Students contemplating this program as a basis for preparation for secondary school science teaching are advised to consult the Science Teaching Center staff of the College of Education for additional requirements for teacher certification.

The Physical Sciences Program consists of a basic set of courses in physics, chemistry and mathematics, followed by a variety of courses chosen from these and related disciplines: astronomy, geology, meteorology and computer science. Emphasis is placed on a broad program as contrasted with a specialized one.

Students are advised by members of the Physical Sciences Committee. This committee is composed of faculty members from each of the represented disciplines and some student representatives. Assignment of advisor depends on the interest of the student, e.g., one interested principally in chemistry will be advised by the chemistry member of the committee. Students whose interests are too general to classify in this manner will normally be advised by the chairman of the committee.

The Curriculum. The basic courses include MATH 140, 141 and one other math course for which MATH 141 is a prerequisite (11 or 12 credits); CHEM 103 and 104, or 105 and 106 (8 credits); PHYS 162, 262, 263 (11 credits); or 141, 142 (8 credits); or 191, 192, 293, 294, 195, 196, 295, 296 (18 credits); or 221, 222 (10 credits); or PHYS 121, 122 followed by PHYS 262 (12 credits).

The choice of the physics sequence depends on the student's future aims and his/her background. PHYS 161, 262, 263 is the standard sequence recommended for most Physical Science majors. This sequence will enable the student to continue with intermediate level and advanced courses. PHYS 141, 142 is available to students who wish a less extensive background in physics than is represented by PHYS 161-263 or 191-294. Students desiring a strong background in physics are urged to enroll in PHYS 191-294. This is the sequence also used by Physics majors and leads directly into the advanced physics courses. PHYS 221, 222 is designed for Education majors, and therefore is suitable for students thinking in terms of a teaching career. PHYS 121, 122 plus 262 is offered as an option only for students who have already taken PHYS 121, 122 and then decide to major in Physical Sciences. This sequence should not be selected by students already in or just starting the program. The rationale for requiring PHYS 262 to follow 121, 122 is to ensure that students have some physics with calculus (121, 122 do not have a calculus corequisite).

Beyond these basic courses the student must complete 24 credits of which 12 must be at the 300 or 400 level, chosen from the following disciplines: Chemistry, physics, mathematics, astronomy, geology, meteorology, and computer science. Students presenting PHYS 294 as part of their basic curriculum may include these credits among the 24 credits. The 24 credits must be so distributed that he or she has at least six credits in each of any three of the above listed disciplines. The program requires an average grade of at least C in courses counting toward the major, including both the basic plus the broader set of courses.

Because of the wide choice and flexibility within the program, students are required to submit for approval a study plan during their junior year, specifying the courses they wish to use in satisfying the requirements of the major.

Students who wish to depart from the stipulated curriculum may present their proposed program for approval by the Physical Science Committee. An honors program is available to qualified students in their senior year.

Certain courses offered in these fields are not suitable for Physical Science majors and cannot count as part of the requirements of the program. These include any courses corresponding to a lower level than the basic courses specified above (e.g. MATH 115), or any of the following: ASTR 100, 105, CHEM 101, 102, 107, CMSC 100, 103, GEOL 120, 431, 432, 460, 489, MATH 105, 110, 111, 115, 210, 211, 478, 481, 483, 484, PHYS 111, 112, 114, 117, 400, 401.

Honors Program. The Physical Sciences Honors program offers students the opportunity for research and independent study. Interested students should request details from their advisor.

Physics and Astronomy

Professor and Chairman: Dragt.
Professor and Director of Astronomy Program: Kerr.
Professor and Associate Chairman: Falk.
Professors: Alley, Banerjee, Bhagat, Brill, Davidson, Day, DeSilva, Dorfman, Earl, Erickson, Ferrell, Glasser, Glover III, Gluckstern, Greenberg, Griem, Griffin, Holmgren, Hornyak, H. Kim, Y. S. Kim, Kundu, H. Laster, Liu, MacDonald, Marion, Misner, Myers, Oneda, Park, Pati, Prange, Pugh, Rieser, Smith, Snow, P. Steinberg, Sucher, Trivelpiece, Wall, Weber, Westerhout, Woo, Yodh, G. T. Zorn.
Professors (Part-Time): Brandt, Friedman, Hayward, McDonald, Opik, Rado, Z. Slawsky.
Associate Professors: A'Hearn, Anderson, Bardasis,

Beall, Bell, C. Y. Chang, Currie, Fivel, Glick, Gloeckler, Goldenbaum, Harrington, Kacser, Korenman, Layman, Matthews, Richard, Roos, Rose, Roush, Zipoy, B. S. Zorn, Zukerman.
Associate Professors (Part-Time): Bennett, Clark, Dixon, Hammer, Pechacek, Trimble.
Assistant Professors: Bagchi, Barnett, Boyd, Brayshaw, C. C. Chang, R. F. Chang, Chant, Y. E. Chen, Drew, Ellsworth, Gowdy, Guillory, Hill, Martin, McClellan, O'Gallagher, R. Steinberg, Wallace.
Visiting Assistant Professors: Bahl, H. H. Chen, Dworzecka, Einstein, Ng.
Lecturers: Allgaier, Chin-Fatt, Deming, M. Slawsky.

The Physics program includes a broad range of undergraduate courses designed to satisfy the needs of almost every student, from the advanced physics major to the person taking a single introductory physics course. In addition, there are various opportunities for personally directed studies between student and professor, and many undergraduate "research" opportunities also are available. For further information consult "Department Requirements for a B.S. degree in Physics," available from the Department.

Courses for Non-Majors. The department offers several courses which are intended for students other than physics majors. PHYS 101, 102, 106, 111 and 112 without a laboratory and PHYS 114, 117 and 120 with laboratory are designed to satisfy the General University distribution requirements. PHYS 121, 122, or 141, 142 satisfy the requirements for professional schools such as medical and dental, and PHYS 161, 262, 263 satisfy the introductory physics requirement for most engineering programs. PHYS 299A provides background for PHYS 121. PHYS 318 is a one semester course stressing contemporary topics for those who have completed a year of one of the above sequences. In addition, PHYS 420 is a one semester modern physics course for advanced students in science or engineering. Either the course sequence 161, 262, 263, or the full sequence 191, 192, 293, 294 is suitable for mathematics students and those who major in other physical sciences.

The Physics Major. The way most physics majors will begin their work is with a two-year basic sequence of physics courses, PHYS 191A or B, 192, 293, and 294, accompanied by the laboratory courses PHYS 195, 196 in the first year and 295, 296 in the second year. Transfer students who come with a different set of introductory courses either will be put into an appropriate course in this sequence or will take bridging courses, such as PHYS 404, 405, and then go on to advanced courses.

The minimum requirement for a physics major is 38 semester hours of work in physics, including six laboratory courses and PHYS 410, 411, 421 and 422, plus MATH 140, 141, 240, 241 (or 150, 151, 250) and one additional 3 or 4 credit mathematics course. Students must have an overall average of at least 2.0 (C) in the required physics and required supporting mathematics courses. After taking the basic sequence, the student will have some flexibility in his program, and he or she will be able to take specialty courses, such as those in nuclear physics or solid-state physics, or courses in related fields which are of particular interest to him or her. In addition, a student interested in doing research may choose to do a bachelor's thesis under the direction of a member of the faculty.

Honors in Physics. The Honors Program offers to students of good ability and strong interest in physics a greater flexibility in their academic programs, and a stimulating atmosphere through contacts with other good students and with individual faculty members. There are opportunities for part-time research participation which may develop into full-time summer projects. An honors seminar is offered for advanced students; credit may be given for independent work or study, and certain graduate courses are open for credit toward the bachelor's degree.

Students are accepted by the department's Honors Committee on the basis of recommendations from their advisors and other faculty members, usually in the second semester of their junior year. A final written or oral comprehensive examination in the senior year is optional, but those who pass the examination will graduate "with honors in physics."

The Astronomy Major. See page for details.
Course Code Prefix—PHYS

Science Communication

Although not a formal degree program, the MPSE Division encourages students to construct academic programs with a view to prepare for careers in science communication. The University of Maryland offers several interdisciplinary approaches to the training of science communicators, ranging from specialization in one science or engineering with background in communication to specializing in journalistic communication with background coursework in the sciences. Each of the several program options can be tailored to the needs of individual students.

Undergraduate students interested in science communications can choose from a wide range of possibilities. For example, some may want a career writing about the general happenings of the day in the physical and life sciences. Or, some students may prefer writing about the span from a pure science to its applied technology. Others may prefer writing about one field — such as agronomy, astronomy, geology — and its impact on society — in ecological problems, space exploration, and plate tectonics.

The following are several approaches: Writing about the *physical sciences:* A recommended approach would be to take the Physical Sciences Program with a minor in Journalism. The Physical Sciences Program consists of a basic set of courses in physics, chemistry, and mathematics, followed by a variety of courses chosen from these and related disciplines: astronomy, geology, meteorology, and computer science.

Writing about the *life sciences:* A recommended approach would be to take the Biological Sciences Program with a minor in Journalism. The Biological Sciences Program includes work in botany, entomology, microbiology, and zoology, and introduces the student to the general principles and methods of each of these biological sciences.

Writing about *engineering:* A recommended approach would be to take a departmental major in any of the sciences, agriculture, or engineering and a minor in Journalism.

Journalism combined with an overview of the sciences: A Journalism major could take selected science courses that provide a familiarity with scientific thought and application.

Additional Campus Programs

Air Force Aerospace Studies Program

The Air Force ROTC provides a program which allows college men and women to attain a commission while completing their University degree requirements.

Two Programs Offered

Four-Year Program – This program is composed of a General Military Course and a Professional Officer Course. The first two years, normally for freshmen and sophomores, give a general introduction to the Air Force and the various career fields. The final two years of ROTC are concentrated on the development of management skills along with inter-personal relationships.

Students in the four-year program must attend four weeks of field training at a designated Air Force base

during the summer after completing the sophomore year of college. To enter the AFROTC program, one should inform his advisor and register for classes in the same manner as for other courses.

Two-Year Program – This program is normally offered to juniors and seniors but may be taken by graduate students. The academic requirements for this program are identical to the final two years of the four-year program. Evaluation of candidates is normally begun during the first semester of the sophomore year. During the summer preceding entry into the program all candidates must complete a six-week field training at a designated Air Force base.

The Curriculum

General Military Course – freshman year, ARSC 100 and ARSC 101; sophomore year, ARSC 200 and ARSC 201. The courses for the freshman and sophomore years are "U.S. Air Force Today," "Of Those Who Fly," and "U.S. Air Power: Ascension to Prominence." In the first two years, cadets attend academic classes once each week. In addition, they receive one hour of Leadership and Management Laboratory each week.

Professional Officer Course – junior year, ARSC 300 and ARSC 301; senior year, ARSC 302 and ARSC 303. The courses for the junior and senior years are "National Security Forces in Contemporary American Society" and "Air Force Leadership and Management" respectively. They require three class hours, plus one hour of Leadership and Management Laboratory per week.

The AFROTC College Scholarship Program provides scholarships for selected cadets each year in the AFROTC program. Those selected receive money for tuition, laboratory expenses, incidental fees, and books for up to eight semesters. In addition, they receive non-taxable monthly allowance of $100.

Students in the Two-Year and Four-Year program enrolled in the Professional Officer Course receive non-taxable monthly pay of $100 for the two-year period regardless of their scholarship status. Students also receive monetary compensation (plus quarters and subsistence) while attending either the four-week or the six-week Field Training Session.

To be accepted into the Professional Officer Course the student must: complete the General Military Course and a four-week Field Training Session, or the six-week Field Training Session; pass the Air Force Otticer Qualification Test; be physically qualified; enlist in the Air Force Reserve; be in good academic standing, and meet age requirements. Successful completion of the Professional Officer Course and a bachelor's degree are the prerequisites for a commission as a Second Lieutenant in the United States Air Force.

Students who have prior military service or ROTC training with the Army, Navy, Marine Corps, Coast Guard, or Air Force will be considered for appropriate credit toward meeting the requirements for the General Military Course. Professional Officer Course (Advanced) credits are transferable.

Students who qualify to become Air Force pilots receive a free 25-hour flight instruction program. Cadets are instructed by both military and civilian instructors on all phases of flight, ground operations and FAA control/regulations. This program gives the student pilot a good start toward obtaining a private license.

Undergraduate Studies

Bachelor of General Studies Degree Program

The Bachelor of General Studies degree program differs from other degree programs in that it is a degree program without a concentration in a specific discipline or department. It does not, however, depart from the high quality standards required of other degree programs.

The BGS program permits the student to obtain an education in as broad a set of disciplines or thought patterns as are offered at the College Park Campus without requiring adherence to a previously defined curriculum with a departmental or divisional orientation.

In the BGS program, the burden for motivation and direction is on the student. Good advice will guide, but institutional commands will not compel students in this program.

Since the very concept of the BGS is predicated on a broad ranging educational objective and not on the more specific requirements of graduate school and professional employment, students who elect this program should specifically be aware that it is not designed to satisfy graduate school admission requirements or professional employment requirements.

Additional information may be obtained from the Office of the Dean for Undergraduate Studies, Room 1115 Undergraduate Library.

Requirements. To receive a Bachelor of General Studies degree, a student must satisfy the following requirements:

1. A minimum of 120 credits must be accumulated with a grade point average of at least 2.0 in all courses.
2. No more than 30 credits in any one department may be applied toward the required 120 credits.
3. The courses taken must be distributed over at least three divisions with a maximum of 60 credits in any one division counted toward the required 120 credits.
4. At least 45 credits must be taken at the upper level (courses numbered 300 or higher); a 2.0 average must be obtained in all upper level courses.
5. The student must be registered as only a Bachelor of General Studies major for at least the last 30 credits immediately preceding the awarding of the degree.
6. The student pursuing the BGS program shall be advised by a faculty member either appointed by or acceptable to the Dean for Undergraduate Studies.

Individual Studies Program

The Individual Studies Program offers an individualized major for UMCP students who

1. have the ability to design, with faculty assistance, a sequence of formal and/or informal learning experiences, satisfactory completion of which is deemed adequate for the awarding of a bachelor's degree and who
2. have a clearly defined academic goal which cannot reasonably be satisfied in an existing curriculum at College Park.

Students may be admitted to the Individual Studies program after completion of one semester of residence at College Park and must be officially approved prior to the final thirty semester hours of the proposed curriculum. They must complete 120 credit hours with an average of C or better and satisfy the General University Requirements.

Students receive a B.A. or B.S. in Individual Studies. The title of the individual program is indicated on the transcript.

Students who wish to apply for the program should see the Assistant Dean for Undergraduate Studies (Room 1115 Undergraduate Library, Ext. 2530, 2531). If the student's enrollment in the program seems appropriate, the student will be given guidance in preparing a preliminary prospectus and in locating a suitable faculty tutor to assist in the preparation of the final prospectus. The prospectus is an outline of the student's educational objectives and when officially approved is filed with the Administrative Dean for Undergraduate Studies and becomes the curriculum under which the student will earn the degree.

General Honors Program

Director: Portz.

The General Honors Program consists of about 750 students. Members of the Program are permitted to enroll in small, honors sections of basic courses in many departments and are given the opportunity of participating in special, upper-level General Honors seminars, independent study, and field experience. Successful General Honors students are graduated with a citation in General Honors, and notation of this accomplishment is made upon their diplomas and transcripts. General Honors also involves an elaborate extra-curricular program. Student participation in decision-making in all aspects of General Honors is encouraged.

Students from any Division or College on the College Park Campus are eligible to apply for admission to the program. Admission to the General Honors Program is ordinarily made at the same time as admission to the University, although a special and separate application form is required for General Honors.

Admission requirements are not fixed, but relative to the background, accomplishments, and motivation of the applicant. Very generally it may be said that students are selected on the basis of grades, rank in class, national test scores, and recommendations from high school teachers and counselors. In addition, however, subjective factors are taken into very serious consideration.

Students customarily apply during their senior year in high school, but in-University students are also admitted during their careers at the University, and students transferring from other institutions are accepted into General Honors upon presentation of a distinguished record, especially if they come to Maryland from another honors program.

The College Park Campus also operates 25 Departmental Honors Programs designed primarily for the majoring student. Most of these programs begin in the junior year, although there are a few exceptions (Botany, English, History, Mathematics, and Psychology), and are administered by committees at the departmental level. For information, see the descriptions under the various departmental entries in this catalog, or contact the Honors Office, as below.

The General Honors Program is a member of the National Collegiate Honors Council and of the Northeast Regional Honors Council.

The General Honors Program is administered by the Director and by the General Honors Committee which also acts as an advisory and regulatory body. For application forms, brochure, and information, write to Dr. John Portz, Director, Honors Office, University of Maryland, College Park, Maryland 20742.

Course Code Prefix—HONR

Pre-Professional Programs

There are a number of programs developed to prepare the pre-professional student. These curricula, some rather general and others quite specific, are designed to give the student the best background to succeed in his advanced training, to fulfill the undergraduate requirements of professional schools, and to fit in with the requirements established by the organizations associated with the respective professions.

Pre-professional programs require that the student maintain a grade point average considerably higher than the minimum for graduation. The student may fulfill requirements by majoring in almost any discipline in some programs, provided the specific requirements of the pre-professional program are met.

The successful completion of the pre-professional program does not guarantee admission to a professional school. Each school has its own admissions requirements and criteria, generally based upon the grade point average in the undergraduate courses, the scores in aptitude tests (Medical College Admission Test, Law Admission Test, Dental Aptitude Test, etc.), a personal interview, and letters sent by the Evaluation Committee of the college. For specific admissions requirements, the student is urged to study the catalog of the professional school of his choice.

Although completion of the bachelor's degree is a normal prerequisite for admission for dental, law, and medical schools, three professional schools of the University of Maryland in Baltimore — Dentistry, Law, and Medicine — have arrangements whereby a student who meets requirements detailed below may be accepted for professional school after three years (90 academic hours). For the students to be eligible for the "combined degree," the final 30 hours prior to entry into the Schools of Dentistry, Law, and Medicine must be taken in residence. After the successful completion of thirty hours of work in professional school, the student may be eligible for a bachelor's degree.

Pre-Dental Hygiene

The primary responsibility of the dental hygiene profession is to promote optimal oral health through the provision of preventive and educational services complementary to those within the purview of the dental profession.

In clinical office practice the dental hygienist's services are provided under the supervision of a dentist and are defined and governed by State dental practice acts. Although minor differences exist between state laws, in general, those services which constitute permissible dental hygiene practice include: obtaining the patient's medical and dental history; conducting a preliminary clinical oral examination of the teeth and surrounding tissues for diagnosis by the dentist; performing diagnostic procedures (x-rays, impressions for study casts, saliva tests, oral cytologic smears, etc.) for use by the dentist; providing a complete oral prophylaxis (removal of all hard and soft deposits and stains and polishing of natural and restored surfaces of the teeth); applying topical medicaments and preventive agents; and assisting with office duties as assigned by the dentist. The dental hygienist also assumes a major role in patient education and counseling and supervision of oral hygiene practices.

Although the majority of dental hygienists are employed in dental offices, there are numerous opportunities and a growing need for those with baccalaureate and graduate degrees in dental hygiene education, community or public health, private and public institutions, commissioned service in the Armed Forces, research, and other special areas of practice. The dental hygienist's activities in these areas are dependent in varying degrees upon dental knowledge and skills in providing clinical services. However, additional study beyond the basic dental hygiene curriculum is essential preparation for advanced professional career opportunities.

Program Description. Dental hygiene offers only a four-year baccalaureate degree program. The curriculum includes two years of pre-professional courses, a third year of intensive dental and dental hygiene study with clinical application and a fourth year of advanced clinical practice and upper division electives in a recommended area of study, which will constitute a minor related to a specialized area of dental hygiene practice. The first two years of the pre-professional curriculum include humanities and social science requirements of the University of Maryland, dental hygiene education accreditation requirements and elective lower division courses. Completion of the pre-professional curriculum at the University of Maryland or another college or university will be required for eligibility to apply for enrollment in dental hygiene as a junior.

Admissions and Applications Procedures. *High School Students.* High school students who wish to enroll in the Pre-Dental Hygiene curriculum should request applications directly from the Admissions Office of the University of Maryland, College Park, Maryland 20742.

Young women or men who wish to prepare for a baccalaureate degree program in dental hygiene should pursue an academic program in high school including the following recommended subjects: biology, chemistry, math, and physics.

Pre-Dental Hygiene Students. Pre-Dental Hygiene students should request applications during the fall semester of their sophomore year from: University of Maryland at Baltimore, Office of Admissions, 660 W. Redwood Street, Baltimore, Maryland 21201. Applications for the Dental Hygiene Program must be received no later than February 1, 1977, for the fall semester 1977.

Only those students who have successfully completed the two-year professional curriculum at the University of Maryland or another college or university will be eligible for admission to the department. *Because enrollment must be extremely limited, registration in the pre-professional curriculum does not assure the student of acceptance in the dental hygiene program.* All applicants will be required to submit Dental Hygiene Aptitude Test scores (DHAT information is available from the Department of Dental Hygiene), to appear for a personal interview at the discretion of the Dental Hygiene Committee on Admissions and have a physical examination. A minimum of C average in the pre-professional curriculum will be required, and preference will be given to those students who have maintained high scholastic records.

Registered Dental Hygienists. Registered dental hygienists who have completed a two-year accredited dental hygiene program at another college or university should apply to enroll in the pre-professional curriculum at one of the University of Maryland undergraduate campuses. Upon completion of general education, basic and social science, advanced dental hygiene courses and elective requirements at the University of Maryland, dental hygiene credits will be evaluated for transferability by the Department of Dental Hygiene and the Baltimore Campus Director of Admissions. Registered dental hygienists should write to the address below for additional information.

Further Information. Information about the professional curriculum or the transfer program for registered dental hygienists may be obtained from the Department of Dental Hygiene, 2109 Turner Laboratory, College Park, Maryland 20742.

Pre-Dental Hygiene Curriculum

The first two years of the pre-professional curriculum are as follows:

	Semester	
Freshman Year	I	II
English Composition 101	3	
Zoology (General) 101	4	
Chemistry 103 and 104	4	4
Psychology 100 — General	3	
Sociology 100 — Introduction		3
Speech 100		3
Humanities		6
Physical Education	(1)	(1)
Total	14	16

	Semester	
Sophomore Year	I	II
Zoology 201 and 202 (Human Anatomy & Physiology)	4	4
Microbiology 200	4	
Nutrition 200		3
Social Sciences**	3	3
Humanities*	3	3
Electives (lower division)	3	3
Total	17	16

*Humanities courses must be selected from at least three of the following areas: literature, history, philosophy, fine arts, speech, math or language.

**Social Sciences must include, in addition to PSYC 100 and SOCY 300, at least six credits selected from courses in psychology, sociology, government and politics, economics, anthropology, or geography.

Although courses may be interchanged during the first two years, it is required that chemistry precede microbiology and nutrition to enable its application to these two subjects. It should be noted that Zoology 101 is a prerequisite for Zoology 201, 202 (Human Anatomy and Physiology) at the University of Maryland.

Pre-Dentistry

The pre-dental program is based upon the requirements and recommendations of the various dental schools, and the requirements for a baccalaureate degree from the College Park Campus, following either the four-year program or the combined Arts-Dentistry Program. The curriculum is designed to prepare the student for the Dental Aptitude Test, which is normally taken in the spring of the junior year.

The following program will satisfy the minimum requirements of most dental schools for either the three-year program (90 academic hours) or the four-year program (120 academic hours).

The suggested program is as follows:

	Hours
General University Requirements	30
Recommended for dental school	
Chemistry (general, inorganic and organic)	18
CHEM 103, 104, 201, 202, 203, 204 or CHEM 105, 106, 211, 212, 213, 214	
Zoology	16
ZOOL 101—General Zoology	
ZOOL 246—Genetics	
ZOOL 290—Comparative Vertebrate Morphology	
ZOOL 430—Vertebrate Embryology	
Mathematics	6-12
Mathematics through calculus (MATH 141 or 221) is strongly recommended	
Physics 121, 122, or 141, 142	8
English	6
Division Requirements	variable
Major and supporting course requirements	variable
Electives to complete the 90 to 120 hours required.	

Four-Year Program. No specific major is required for favorable consideration by a dental school admissions committee. By intelligent planning starting in his freshman or sophomore year, the student can meet the requirements for the B.S. or B.A. degree in most major programs and can include in his course work any courses specifically prescribed by dental schools of his choice. The student is urged to work closely with his pre-dental major advisers in this planning.

Three-Year Arts-Dentistry Program. Students whose performance during the first two years is exceptional may seek admission to the University of Maryland Dental School at the end of their third year (90 academic hours). No undergraduate major is required for this program; the work of the first year in the School of Dentistry is considered as the major. By the end of his third year the student will need to have completed all of the requirements listed above with the exception of the major and supporting course requirements. Students in this program will select supporting courses from any one of the following combinations:

Zoology—six hours on the 300-400 level.

Microbiology—eight hours on the 300-400 level.

CHEM 321—plus three hours on the 300-400 level in any natural science.

CHEM 461, 462, 463, and 464.

Nine hours on the 300-400 level in any one department of the arts, humanities or social sciences.

Students accepted in the combined Art-Dentistry program may receive the B.S. degree (Arts-Dentistry) after satisfactory completion of the first year at the University of Maryland Dental School upon recommendation by the Dean of the Dental School and approval by the College Park Campus, the degree to be awarded in August following the first year of Dental School.

Schedule: The pre-dental student usually includes in the first year schedule chemistry, mathematics and zoology, and English if needed. The second year should include the second year of chemistry and recommends comparative vertebrate morphology (ZOOL 290) and genetics (ZOOL 246) plus additional mathematics if needed. The third year should include physics (121, 122 or 141, 142). Additional recommended courses are embryology (ZOOL 430), analytical chemistry, and a course in statistics. At all times general university, divisional and department major requirements should be kept in mind. It is advisable for pre-dental students to design an individual program that shows strength in science-math and breadth in the social sciences and humanities.

Pre-Forestry

Pre-Forestry students are advised in the Department of Horticulture section. See page 47 for information about this program.

Pre-Law

Although some law schools will consider only applicants with a B.A. or B.S. degree, others will accept applicants who have successfully completed a three-year program of academic work. Most law schools do not prescribe specific courses which a student must present for admission, but do require that the student follow one of the standard programs offered by the undergraduate college. Many law schools require that the applicant take the Law School Admission Test, preferably in July or October of the academic year preceding his entry into professional school.

Four-Year Program. The student who plans to complete the requirements for the B.A. or B.S. degree before entering law school should select a major field of concentration. The pre-law student often follows a bachelor of arts program with a major in American studies, English, history, economics, political science (government and politics), psychology, sociology, or speech, a few pre-law students follow a bachelor of science program.

Three-Year Arts-Law Program. The student who plans to enter law school at the end of his third year should complete the General University Requirements. By the end of his junior year he will complete the requirements for a "minor" (18 semester hours in one department, 6 hours being at the 300-400 level). His program during the first three years should include all of the basic courses required for a degree (including the 18-hour "minor" course program) and all divisional and University requirements. The academic courses must total 90 hours, and must be passed with a minimum average of 2.0. To be acceptable to law schools, however, students in virtually all cases must have a considerably higher average.

Students with exceptional records who are accepted to the School of Law of the University of Maryland under the Arts-Law program may receive a B.A. degree (Arts-Law) after satisfactory completion of the first year of law school, upon recommendation by the Dean of the University of Maryland Law School and approval by the College Park Campus. The degree is awarded in August following the first year of law school (or after 30 credit hours are completed).

Pre-Medical Technology

The University of Maryland offers a baccalaureate degree program in Medical Technology to be completed in four academic years. Students who have been accepted into the Medical Technology Program study during the senior year at the School of Medicine and the University of Maryland Hospital in Baltimore. The program fulfills requirements set forth by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) and the Council on Medical Education of the American Medical Association (AMA). Upon successful completion of the program, graduates are eligible to take the Medical Technology national certification examination given by the Board of Registry of the American Society for Clinical Pathology (ASCP). Students will not receive a degree in Medical Technology from the University of Maryland unless they attend the senior year at the Baltimore Campus.

Pre-professional Curriculum. Students must complete at least 90 semester hours of academic preparation, exclusive of Health and Physical Education, before beginning the professional segment of the Medical Technology Program. A curriculum guide is included which will assist the student in planning the first three years of study which fulfills University of Maryland and National Accrediting Agency for Clinical Laboratory Science requirements.

Professional Curriculum. Students are accepted into the Medical Technology Program on a competitive basis. Successful completion of 90 semester hours does not guarantee admission to the professional segment of the program.

The professional segment, of 12 months duration, is administered by the University of Maryland School of Medicine at the Baltimore Campus. Two classes are admitted each year (January and July). Full-time attendance is required during the senior year. The first six months of this year consist of lectures, didactic laboratories and simulated clinical laboratory instruction. The second half of the year involves rotation in each discipline of the clinical laboratories at the University of Maryland Hospital.

Application and Admission. Applicants must meet all admission requirements of the University of Maryland. At least three years of college preparatory mathematics and science, including chemistry and physics, are strongly recommended.

Applications to the professional school will not be considered until the first semester of the junior year. At that time, the applicant submits an undergraduate Professional Application for Admission. All applications for admissions will be sent by the Director of Admissions, Howard Hall, Room 132, 660 W. Redwood Street, Baltimore, Maryland 21201. Advancement to the professional segment is determined by criteria set by the "Committee on Admissions."

Applicants are required to take the ALLIED HEALTH PROFESSIONS ADMISSION TEST. For further information, see your counselor or write to P.O. Box 3540, Grand Central Station, New York, New York 10017.

Pre-Medical Technology Program Requirements

	Credits
CHEMISTRY (16-credit minimum)	
CHEM 103, 104—College Chemistry I, II	4,4
Additional 8 credits from the following courses	
CHEM 203, 204—College Chemistry IV	3
and College Chemistry Laboratory IV	2
CHEM 321—Quantitative Analysis	4
or	
CHEM 461, 463—Biochemistry I	3
and Biochemistry Laboratory I	2
BIOLOGICAL SCIENCE (16-credit minimum)	
ZOOL 101—General Zoology	4
MICB 200—General Microbiology	4
Additional 8 credits from the following courses	
ZOOL 201, 202—Human Anatomy and Physiology	4,4
ZOOL 246—Genetics	4
ZOOL 290—Comparative Vertebrate Morphology	4
ZOOL 411—Cellular Biology	4
MICB 440—Pathogenic Microbiology	4
MATHEMATICS (6 credits)	
MATH 110 or 115	3
MATH 111	3

RECOMMENDED ELECTIVES
CHEM 261, 302, and 462; ZOOL 475 and 495; MICB 450 and 460; PHYS 121 and 122; PSYC 200

Acceptable electives must be approved by the Medical Technology advisor.

GENERAL UNIVERSITY REQUIREMENTS
AREA A—not required for medical technology students
AREA B—6-credits required
Any 6 credits from courses listed under either of the two divisions: Human and Community Resources; Behavioral and Social Sciences.
AREA C—12-credits required
SPCH 100 3
A minimum of 6 credits in English is required. An additional 3 credits from any of the courses listed in the Division of Arts and Humanities. (Students will be required either to show proficiency in English composition — the Illinois Rhetoric Test — or to take ENGL 101, Introduction to Writing).

Pre-Medicine

The pre-medical program is based upon the requirements and recommendations of American medical schools, and the requirements for a baccalaureate degree from the College Park Campus, following either the four-year program or the combined Arts-Medicine program. The curriculum is designed to prepare the student for the Medical College Admission Test, which is normally taken in the spring of the junior year.

The following program will satisfy the minimum requirements of most medical schools for either the three-year program (90 academic hours) or the four-year program (120 academic hours):

	Hours
General University Requirements	30
Medical School Requirements	
Chemistry (general, inorganic, and organic)	18
CHEM 103, 104, 201, 202, 203, 204 or	
CHEM 105, 106, 211, 212, 213, 214	
Zoology	16
ZOOL 101—General Zoology	
ZOOL 246—Genetics	
ZOOL 290—Comparative Vertebrate Morphology	
ZOOL 430—Vertebrate Embryology	
Mathematics	6-12
Mathematics through calculus (MATH 141 or 221) is strongly recommended	
Physics 121, 122 or 141, 142	8
English	6
Division requirements	variable
Major and supporting course requirements	variable
Electives, to complete the 90 to 120 hours required	

Four-Year Program. No specific major is required for favorable consideration by a medical school admissions committee. By intelligent planning starting in the freshman or sophomore year, the student can meet the above requirements as well as the requirements of most majors for the B.A. or B.S. degree. The student is urged to work closely with his pre-medical and major advisors in this planning. A student who enters the pre-medical program late in his college career may find an additional year of study necessary (either as a special student or as a regular undergraduate).

Three-Year Arts-Medicine Program. A student whose performance during the first two years is exceptional may seek admission to the University of Maryland Medical School at the end of the third year (90 academic hours). During his third year he will need to complete all the requirements listed above, with the exception of the major and regular supporting course program. Four additional hours on the 300-400 level in appropriate science courses will satisfy the supporting course requirements of the Arts-Medicine Program.

Students accepted in the combined Arts-Medicine program may receive the B.S. degree (Arts-Medicine) after satisfactory completion of the first year at the University of Maryland School of Medicine (30 academic hours), upon recommendation by the Dean of the School of Medicine and approval by the College Park Campus. The degree is awarded in August following the first year of medical school.

Schedule. The pre-medical student usually includes in his first year schedule chemistry, mathematics and zoology, and English if needed. The second year should include the second year of chemistry, and we recommend comparative vertebrate (ZOOL 290), genetics (ZOOL 246), completion of mathematics through calculus and courses in the social sciences or humanities. The third year should include physics (121, 122 or 141, 142). Vertebrate embryology (ZOOL 430) and courses in the social sciences or humanities such as history, political science, psychology, and fine arts are recommended. Courses necessary to complete the divisional, major department and general university requirements should be considered at all times. It is advisable for pre-medical students to design an individual program that shows strength in science-math and breadth in the social sciences and humanities.

Pre-Nursing

The School of Nursing. The program in professional nursing leading to the baccalaureate degree in nursing, is available to qualified applicants without discrimination in regard to age, creed, ethnic origin, marital status, race, or sex. The School of Nursing is approved by the Maryland State Board of Examiners of Nurses and accredited by the National League for Nursing.

Admission and Progression. It is recommended that students enroll in the college preparatory program in high school. In addition to other academic subjects required for graduation, the following subjects are strongly recommended: mathematics (college preparatory) (3 credits); biology (1 unit); and chemistry (1 unit). Study in the subjects listed above provides a foundation for college pre-professional course requirements.

Admission to the upper division program in the School of Nursing on the Baltimore Campus is limited to the number of students that can be accommodated, and selection must be made from applicants who are judged to have the most potential for completing the professional program. Academic performance in pre-professional courses is an important factor. It is important that students who enroll in the freshman and sophomore years in preparing for nursing recognize that although every effort is made to continue to expand the enrollment of the professional program on the Baltimore Campus, there is no way in which the student can be guaranteed admission to the professional program.

Further Information. Information about the total program may be obtained from Room 2106, Turner Laboratory, on the College Park Campus. Also, upper division program information may be obtained from the School of Nursing, 655 West Lombard Street, Baltimore, Maryland 21201.

Pre-Nursing Requirements. It is required that all students, including registered nurses, enrolled in or transferring to the program in nursing use the following guidelines for the freshman and sophomore years:

	Semester Hours
English Composition	3
***Chemistry (including content in organic chemistry)	6-8
***Human Anatomy and Physiology	6-8
***Microbiology	3-4
***Social Sciences*	12
Humanities**	15
Nutrition (required as of fall 1978)	3
Electives	11-7
Minimum requirements for Junior status	59-60

Social Sciences include Sociology, Psychology, Political Science, Economics, Geography, Anthropology

Humanities include Literature, History, Philosophy, Foreign Languages, Mathematics, Fine Arts

*Courses must include at least one in sociology and one in psychology

**Courses must be selected from at least three departments

***Social, physical and natural sciences taken ten years prior to student's admission date will not be accepted, effective 1977-78

The specific courses taken by basic students on the College Park Campus are:

	Semester Hours
Chemistry 103, 104	4,4
English 101	3
Zoology 101	4
Humanities (literature, history, philosophy, fine arts, math, language)*	15
Psychology 100	3
Sociology 100	3
Other social sciences (sociology, psychology, anthropology, government and politics, economics, geography)	6
Zoology 201, 202	4,4
Microbiology 200	4
Nutrition 200 (recommended)	3
Elective	2-3
	59-60

*Courses must be selected from at least three of the areas listed

Pre-Optometry

Requirements for admission to schools and colleges of optometry vary, but in all schools emphasis is placed on mathematics, physics, chemistry, and biology. Most schools also require additional courses in such areas as English, psychology, social sciences, philosophy, foreign languages, and literature. A minimum of two years of pre-optometry studies is required for admission to accredited schools, but at present better than 50% of successful applicants hold a bachelor's or higher degree. Students who contemplate admission to optometry schools may major in any program that the University offers, but would be well-advised to write to the optometry schools of their choice for specific course requirements for admission. Students who seek further information should consult the pre-professional advisor in the Office of Undergraduate Studies.

Pre-Pharmacy

The purposes of the School of Pharmacy are to train students for the efficient, ethical practice of all branches of pharmacy; to instruct students in general scientific and cultural subjects so they can read critically, express themselves clearly and think logically as members of a profession and citizens of a democracy; and to guide students into productive scholarship and research for the increase of knowledge and techniques in the healing arts of pharmacy.

The School of Pharmacy is accredited by the American Council on Pharmaceutical Education. The School holds membership in the American Association of Colleges of Pharmacy.

Correspondence. All correspondence prior to entrance in the Pre-professional Program College Park should be addressed to the Director of Admissions, University of Maryland, College Park, Maryland 20742.

All correspondence relative to entrance in the Professional Program should be addressed to the School of Pharmacy, University of Maryland, 636 W. Lombard Street, Baltimore, Maryland 21201.

On the College Park Campus the pharmacy student advisor's office is in the Turner Laboratory, Room 202, telephone number 454-2540.

Five-Year Program. A minimum of five academic years of satisfactory college work is required for the completion of the present pharmacy curriculum of the University of Maryland. This five-year curriculum meets the minimum requirements established by the American Association of Colleges of Pharmacy and the American Council on Pharmaceutical Education.

At the University of Maryland the five-year program consists of two years of pre-professional and a three-year pharmacy program. The pre-professional program is not available in Baltimore, but may be obtained at the College Park, Baltimore County (UMBC), or Eastern Shore (UMES) Campuses of the University of Maryland or at any other accredited university or junior or senior college where appropriate courses are offered.

Six-Year Program. In 1975, a Doctor of Pharmacy degree program will also be offered. Applicants would be considered after the two-year pre-pharmacy program in two years of the professional program in Baltimore.

Interested secondary school students are invited to write to the Dean of the School of Pharmacy in Baltimore for a catalog concerning the School and for literature about the opportunities in the pharmacy profession.

Recommended High School Preparation. The completion of an academic program containing the following courses is required for enrollment in the School of Pharmacy:

Subjects	Recommended Units	Required Units
English	4	4
College Preparatory Mathematics — including algebra (1), plane geometry (1), and additional units in advanced algebra, solid geometry, trigonometry, or advanced mathematics	4	2
Physical Sciences (Chemistry and Physics)	2	1
History and Social Sciences	2	1
Biological Sciences	1	0
Foreign Language—German or French	2	0
Unspecified academic subjects	1	8
Total	16	16

Admission to the Professional Program at Baltimore. Only the three-year professional program is offered in Baltimore.

Students of all races, colors and creeds are equally admissible. It is the objective of the University of Maryland Baltimore City Campus to enroll students with diversified backgrounds in order to make the educational experience more meaningful for each student.

From College Park Campus. Students who have completed the prescribed pre-professional program at College Park with a scholastic average of not less than 2.25, and who are in good standing will be considered for advancement to the pharmacy program in Baltimore, subject to the decision of the Admissions Committee of the School of Pharmacy. Applicants should be aware that the 2.25 is a minimum average for consideration and that the average for all successful applicants has been 3.0.

In the semester preceding enrollment in the Baltimore division of the School of Pharmacy, each student will be required to file an application with the Baltimore Office of Admissions and Registrations.

The Pharmacy College Admission Test (PCAT) is required of all applicants to the professional program in Baltimore.

Pre-Pharmacy Curriculum. The pre-professional curriculum is designed to provide the student with those courses that satisfy the needs for a more liberal education as well as the scientific prerequisite courses for entrance into the professional program.

First Year	Credits
Chemistry 103, 104	8
Mathematics 115, 220 (Introductory Analysis and Elementary Calculus)	6
Zoology 101 (or Biology)	4
English 101 (Composition)	3
Elective (Social Sciences)	3
Elective (non-specific)	3
	28

Second Year	
Chemistry 201, 202, 203, 204	*10
Physics 121, 122 (Fundamentals)	8
Elective (Humanities)	6
English (Literature)	3
Elective (non-specific)	3
Elective (Social Science)	3
	33

*Minimum requirement for organic chemistry is 8 credits

Pre-Physical Therapy

The Department of Physical Therapy offers a four-year program divided into a pre-professional division and a professional division. The pre-professional requirements may be completed on any of the University of Maryland campuses, or any regionally accredited university or college. The professional division courses are offered *only* on the Baltimore City Campus. The physical therapy curriculum is approved by the Council of Medical Education of the American Medical Association in collaboration with the American Physical Therapy Association.

The professional services of the physical therapist are offered to people who are disabled by illness or accident or were born with a handicap. Clinical practitioners are responsible for the evaluation of each patient's ability, disability and potential for recovery. The most common areas of disorder include neuromuscular, musculo-skeletal, sensory motor, and related cardio-vascular and respiratory functions.

On the basis of test findings a treatment program is planned and implemented within the referral of the licensed physician or dentist with whom the contact is maintained regarding patient care and progress. Treatment techniques include the therapeutic use of heat, cold, water, electricity, light, ultra-sound, massage, exercise and functional training. Instruction is given to the patient, the family and others who might help during the treatment and convalescent period.

Most physical therapists are employed in hospital clinics, rehabilitation centers, private practice, schools for handicapped children and nursing homes.

Advanced degree programs are available in a few universities and colleges across the country. A master's degree enables physical therapists to hold positions in education, research, administration and as consultants. Ph.D. degrees may be earned in allied academic areas.

Admission Information. High school students who are interested in physical therapy should enroll in the college preparatory program. The subjects specifically recommended for adequate background are biology, chemistry, physics and three units of mathematics. Completion of a year of high school public speaking will provide exemption from the college speech requirement.

For an application for admission to the University of Maryland's College Park Campus, write to: Admissions Office, University of Maryland, College Park, Maryland 20742.

Pre-professional. Admission to the lower division is open to all students meeting the University admission requirements. Advisement is available in preparation for transfer to the professional program on the University of Maryland at Baltimore Campus. Admission to the pre-professional division at College Park does not guarantee admission to the professional division at Baltimore.

Professional. An admission committee is charged with selecting students annually for the fall semester. Minimum qualification at the junior level is the completion of 60 designated credits with a grade of C or better in each of the required pre-professional courses. The minimum grade point average for admission is 2.0 on a 4.0 scale. However, it is only realistic to assume that a higher average is needed for selection. It is unlikely that non-resident candidates with less than a 3.0 average will be considered. There is no exclusion based on sex, age, ethnic background or prior completion of another academic degree.

Application. Application for admission to the professional division is necessary. To obtain an application, address your request to: University of Maryland, Office of Admissions and Registrations, 660 W. Redwood Street, Baltimore, Maryland 21201.

A student who can realistically meet the academic requirements and who wishes to be considered a candidate for the junior class should submit a request for an application after October 1 preceding the year of admission. Application receipt deadline is February 1, and supporting documents must be received by March 1 of the year of admission. Selection of applicants is based on academic achievement, an admission test and a personal interview.

Further Information. Information may be obtained on the College Park Campus in the Turner Laboratory, Room 2109.

Information concerning the upper division may be obtained by contacting the Department of Physical Therapy, Allied Health Professions Building, 32 S. Greene Street, Baltimore, Maryland 21201.

Pre-Physical Therapy Requirements. The minimum requirements for entry into the junior year of the professional program total 60 credits.

*MATH 110, 111	6
or MATH 220 or MATH 140 (3 credits plus 3 electives)	
CHEM 103, 104	8
PHYS 121, 122	8
ZOOL 101	4
One of the following courses	
ZOOL 201, 202, 209, 246, 290, 293	4
SOCIAL SCIENCE	3
(Afro-American Studies, Anthropology, Economics, Government and Politics, Urban Studies, Sociology, Geography)	
PSYC 100	3
PSYC (one course above the intro. level)	3
ENGL 101	3
(Students with advanced credit or exemption may substitute a 3 credit elective)	
SPCH 100	3
(Students with one year of high school speech may substitute a 3 credit elective)	
ARTS AND HUMANITIES	6
(Courses chosen from: History, Literature, Foreign Language, Philosophy, *Appreciation of:* Art, Music, Drama, Dance)	
Electives*	9

*Selections may be made in any area with no *more than 2 credits of skills or activities* courses accepted. Introductory or review courses below the level required in Biology, Chemistry, Physics and Mathematics *MAY NOT* be used as electives.

Orientation Course. BTPT 001 — Physical Therapy Orientation (1 credit not towards a degree). In an effort to increase the knowledge and awareness of students interested in the field of physical therapy, a lecture series is offered during the fall semester. The areas of professional academics and clinical practice will be covered.

Pre-Physical Therapy Curriculum

FRESHMAN YEAR	
FALL	
MATH	3
CHEM 103	4
ENGL 101	3
PSYC 100 or SPCH 100	3
Elective	1-3
Total Semester Credit Load	14-16

SPRING	
MATH	3
CHEM 104	4
PSYC 100 or SPCH 100	3
ZOOL 101	4
Elective	1-4
Total Semester Credit Load	15-18

SOPHOMORE YEAR

FALL	
PHYS 121	4
ARTS & HUMANITIES	3
PSYC	3
ZOOL	4
Elective	1-4
Total Semester Credit Load	15-18

SPRING	
PHYS 122	4
ARTS & HUMANITIES	3
SOCIAL SCIENCE	3
Elective	3
Elective	1-4
Total Semester Credit Load	14-17

Pre-Radiologic Technology

The Radiologic Technology program of the University of Maryland is four years in duration, leading to a bachelor of science degree and qualifying the individual to take the certifying examination of the American Registry of Radiologic Technologists. The Radiologic Technology curriculum of the University of Maryland is approved by the Joint Review Committee of the American Medical Association and the American Society of Radiologic Technologists.

The first two years of the program are devoted to fulfilling the pre-professional requirements, which enable the student to apply to the professional division at the Baltimore City Campus of the University of Maryland. The pre-professional requirements (listed below) may be completed on any undergraduate campus of the University of Maryland or any regionally accredited College or University.

The student who can realistically meet the academic requirements and who wishes to be considered a candidate for the junior class should submit a request for an application to the Baltimore City Campus after October 1 of the preceding year. Application deadline is April 1 preceding the expected date of entry. Students are selected on the basis of grade point average, interests and academic background. A grade point average of 2.5 is the minimum for consideration for admission.

The Radiologic Technologist is principally concerned with the utilization of sophisticated diagnostic imaging systems which are used in a wide variety of clinical procedures to provide the physician with images of the internal anatomy of the patient as an aid to diagnosis. The curriculum includes courses in Radiologic Physics, Radiation Protection and Radiobiology, and Anatomy, Physiology and Pathology as depicted on the x-ray film. Introductory courses in teaching and administration in Radiologic Technology, as well as peripheral areas such as Nuclear Medicine, Radiation Therapy and others are included in the curriculum. The Radiologic Technology Program of the University of Maryland is designed to produce an individual who is both clinically competent and academically qualified to function in a wide variety of positions in radiology and related fields. Additionally, the program is intended to provide an academic background sufficient to enable the qualified student to pursue a graduate degree in Radiology Administration, Education, or the Radiological Sciences.

Students desiring further information may contact an advisor through the Office of Allied Health Professions in Room 2109 of the Turner Laboratory on the College Park Campus, or may write directly to: Division of Radiologic Technology, Allied Health Professions Building, 32 S. Greene Street, Baltimore, Maryland 21201.

Pre-Radiological Technology Requirements. Students desiring to enter the program should contact an advisor through Room 2109 of the Turner Laboratory as soon as possible. Students must complete 60 semester hours of academic work prior to being officially admitted to the Junior year at the Baltimore City Campus. Students should file an application after completion of 45 semester hours.

The following list of courses should be closely adhered to for consideration for admission:

	Semester Hours
English	9
Speech	3
Physics	8
Chemistry	8
Biology or Zoology	8
Mathematics	3
Psychology	3
Sociology	3
Fine Arts or Philosophy	3
Electives	12

Students intending to fulfill the pre-professional requirements at the College Park Campus are encouraged to pursue the following courses:

	Semester Hours
English 101	3
Any other 6 credits in English	6
Speech 100	3
Physics 121, 122*	8
Chemistry 103, 104	8
Zoology 101 plus another 4 credit course in Zoology	8
Math 110**	3
Psychology 100	3
Sociology 100	3
Any Fine Arts or Philosophy course	3
Electives	12
	60

*A higher level physics sequence will also suffice.
**Science oriented students may elect to complete math through Math 141.

Pre-Theology

The Pre-Theology program is located within the College of Agriculture. See page 47 for information about this program.

Pre-Veterinary Medicine

The Pre-Veterinary Medicine program is located within the College of Agriculture. See page 47 for information about this program.

Course Offerings 4

Afro-American Studies

AASP 100 Introduction to Afro-American Studies. (3) A survey of significant aspects of black life and thought which are reflected in black literature, music and art. This inter-disciplinary course examines the African cultural and historical backgrounds and traces the development of black culture in Africa, the United States and the Caribbean from the fifteenth century to contemporary times. Emphasis is placed upon the social, political and economic changes in black life that have influenced the ideas of black artists and spokesmen.

AASP 101 Elementary Swahili. (3) An introductory course in the Swahili language. Study of linguistic structure and development of audiolingual ability. Three recitations and one laboratory hour per week.

AASP 102 Intermediate Swahili. (3) Three recitations and one laboratory per week. Further study of linguistic structure and development of audiolingual and writing ability, and introduction to the reading of literary texts.

AASP 112 Advanced Swahili. (3) For students who wish to develop fluency and confidence in the speaking, reading and writing of Swahili language. Discussions in Swahili.

AASP 200 African Civilization (3) A survey of African civilizations from 4500 B.C. to present. Analysis of traditional social systems. Discussion of the impact of European colonization on these civilizations. Analysis of the influence of traditional African social systems on modern African institutions as well as discussion of contemporary processes of Africanization.

AASP 202 Black Culture in the United States. (3) The course examines important aspects of American Negro life and thought which are reflected in Afro-American literature, drama music and art. Beginning with the cultural heritage of slavery, the course surveys the changing modes of black creative expression from the nineteenth century to the present.

AASP 298 Special Topics in Afro-American Studies. (3) An introductory multi-disciplinary and inter-disciplinary educational experience to explore issues relevant to black life, cultural experiences, and political, economic and artistic development. May be repeated to a maximum of six credits if subject matter is different.

AASP 300 The Black Community and Public Policy. (3) A study of the role and impact of the black community in public policy formulation; scope and methods in public policy focusing on specific problems in the black community; analysis and review of relationships between the policy makers and the community. With permission of the program, students may elect to devote time to specific community projects as part of the requirements of the course. The student will not serve in an agency in which he is already employed.

AASP 311 The African Slave Trade. (3) The relationship of the slave trade of Africans to the development of British capitalism and its industrial revolution; and to the economic and social development of the Americas.

AASP 312 Social and Cultural Effects of Colonization and Racism. (3) A comparative approach to the study of the social and cultural effects of colonization and racism on black people in Africa, Latin America and in the United States — community and family life, religion, economic institutions, education and artistic expression.

AASP 397 Senior Reading and Research Seminar in Afro-American Studies. (3) An interdisciplinary reading and research senior seminar for majors in Afro-American studies or majors in other departments or programs who have completed at least eighteen hours of Afro-American studies courses. Emphasis on research and writing methods in Afro-American studies. A senior thesis will be completed during the course.

AASP 400 Directed Readings in Afro-American Studies. (3) The readings will be directed by the director of Afro-American studies. Topics to be covered: the topics will be chosen by the director to meet the needs and interests of individual students.

AASP 401 Seminar in Afro-American Studies. (3) The theory and concepts of the social and behavioral sciences as they relate to Afro-American studies. Required for the certificate in Afro-American studies. Prerequisites: at least 15 hours of Afro-American studies or related courses or permission of the director.

AASP 403 The Development of a Black Aesthetic. (3) An analysis of selected areas of black creative expression in the arts for the purpose of understanding the informing principles of style, techniques, and cultural expression which make up a black aesthetic. Prerequisite, completion of ENGL 443 or AASP 302 or consent of instructor.

AASP 410 Contemporary African Ideologies. (3) Analysis of contemporary African ideologies. Emphasis on philosophies of Nyerere, Nkrumah, Senghor, Sekou Toure, Kaunda, Cabral, et al. Discussion of the role of African ideologies on modernization and social change.

AASP 411 Black Resistance Movements. (3) A comparative study of the black resistance movements in Africa and America; analysis of their interrelationships as well as their impact on contemporary Pan-Africanism.

AASP 428 Special Topics in Black Development. (3) A multi-disciplinary and inter-disciplinary educational experience concerned with questions relevant to the development of black people everywhere. Development implies political, economic, social, and cultural change among other things. Consequently, a number of topics may be examined and studied.

AASP 429 Special Topics in Black Culture. (3) An interdisciplinary approach to the role of black artists around the world. Emphasis is placed upon contributions of the black man in Africa, the Caribbean and the United States to the literary arts, the musical arts, the performing arts, and the visual arts. Course content will be established in terms of those ideas and concepts which reflect the cultural climate of the era in which they were produced. Attention to individual compositions and works of art through lectures, concepts, field trips, and audio-visual devices.

Agricultural Engineering

AGEN 100 Basic Agricultural Engineering Technology. (3) An introduction to the application of engineering concepts. Topics include quantitation and measurement; mechanical, thermal, fluid and electrical principles and their relationship to biological systems and materials of agricultural and aquacultural products (for non-engineering majors).

AGEN 200 Introduction to Farm Mechanics. (2) One lecture and one laboratory period a week. A study of the hand tools and power equipment and their safe use as it applies to mechanized farms. Principles and practice in arc and gas welding, cold metal and sheet metal work are provided. Also, tool fitting, woodworking, plumbing, blue print reading and use of concrete.

AGEN 232 Water, A Renewable Resource. (3) Occurrence and distribution of water. Review of both natural and man-made water resource systems. Basics of water quality and waste water treatment.

AGEN 300 Energy and Food. (1) An exposition of the energy inputs into the production, processing, marketing and consumption of our food supply.

AGEN 305 Farm Mechanics. (2) Two laboratory periods a week, available only to seniors in agricultural education. This course consists of

laboratory exercises in practical farm shop and farm equipment maintenance, repair, and construction projects, and a study of the principles of shop organization and administration.

AGEN 313 Mechanics of Food Processing. (4) Three lectures and one laboratory. Prerequisite PHYS 111 or 121. Applications in the processing and preservation of foods of power transmission, hydraulics, electricity, thermodynamics, refrigeration, instruments and controls, materials handling and time and motion analysis.

AGEN 324 Engineering Dynamics of Biological Materials. (3) Three lectures per week. Prerequisite, ENME 340. Investigates the physical parameters (impact, temperature, humidity, light, etc.) governing the response of biological materials. Analysis of unit operations and their effect on the physical and quality characteristics of agricultural products.

AGEN 343 Functional Design of Machinery and Equipment. (3) Two lectures and one two hour laboratory per week. Prerequisite, ENES 221. Theory and methods of agricultural machine design. Application of machine design principles and physical properties of soils and agricultural products in design of machines to perform specific tasks.

AGEN 401 Agricultural Production Equipment. (3) Two lectures and one laboratory per week. Prerequisite, AGEN 100. Principles of operation and functions of power and machinery units as related to tillage; cutting, conveying, and separating units; and control mechanisms. Principles of internal combustion engines and power unit components.

AGEN 402 Agricultural Materials Handling and Environmental Control. (3) Two lectures and one laboratory per week. Prerequisite, AGEN 100. Characteristics of construction materials and details of agricultural structures. Fundamentals of electricity, electrical circuits, and electrical controls. Materials handling and environmental requirements of farm products and animals.

AGEN 421 Power Systems. (3) Two lectures and one two hour laboratory per week. Prerequisites, ENME 216, ENEE 300 and ENME 340. Analysis of energy conversion devices including internal combustion engines, electrical and hydraulic motors. Fundamentals of power transmission and coordination of power sources with methods of power transmission.

AGEN 422 Soil and Water Engineering. (3) Three lectures per week. Prerequisite, ENME 340. Applications of engineering and soil sciences in erosion control, drainage, irrigation and watershed management. Principles of agricultural hydrology and design of water control and conveyance systems.

AGEN 424 Functional and Environmental Design of Agricultural Structures. (3) Two lectures and one hour laboratory per week. Prerequisite, AGEN 324. An analytical approach to the design and planning of functional and environmental requirements of plants and animals in semi- or completely enclosed structures.

AGEN 432 General Hydrology. (3) Three lectures per week. Qualitative aspects of basic hydrologic principles pertaining to the properties, distribution and circulation of water as related to public interest in water resources.

AGEN 433 Engineering Hydrology. (3) Three lectures per week. Prerequisites, MATH 246, ENCE 330 or ENME 340. Properties, distribution and circulation of water from the sea and in the atmosphere emphasizing movement overland, in channels and through the soil profile. Qualitative and quantitative factors are considered.

AGEN 435 Aquacultural Engineering. (3) Prerequisite, consent of department. A study of the engineering aspects of development, utilization and conservation of aquatic systems. Emphasis will be on harvesting and processing aquatic animals or plants as related to other facets of water resources management.

AGEN 488 Topics in Agricultural Engineering Technology. (1-3) Prerequisite, permission of the instructor. Selected topics in agricultural engineering technology of current need and interest. May be repeated to a maximum of six credits if topics are different. Not acceptable for credit towards major in agricultural engineering.

AGEN 489 Special Problems in Agricultural Engineering. (1-3) Prerequisite, approval of department. Student will select an engineering problem and prepare a technical report. The problem may include design, experimentation, and/or data analysis.

AGEN 499 Special Problems in Agricultural Engineering Technology. (1-3) Prerequisite, approval of department. Not acceptable for majors in agricultural engineering. Problems assigned in proportion to credit.

Agriculture

AGRI 101 Introduction to Agriculture. (1) Required of all beginning freshmen and sophomores in agriculture. Other students must get the consent of the instructor. A series of lectures introducing the student to the broad field of agriculture.

AGRI 301 Introduction to Agricultural Biometrics. (3) Two lectures and one laboratory period per week. Prerequisite, University math requirement. Descriptive statistics, sampling, confidence interval estimation, introduction to hypothesis testing, simple, regression and correlation. Course emphasis shall be on application of simple statistical techniques and on interpretation of the statistical results.

AGRI 401 Agricultural Biometrics. (3) Two lectures and one laboratory period per week. Prerequisite, MATH 115 or equivalent. Probability, measures of central tendency and dispersion, frequency distributions, tests of statistical hypothesis, regression analyses, multiway analysis with emphasis on the use of statistical methods in agricultural research.

AGRI 489 Special Topics in Agriculture. (1-3) Credit according to time scheduled and organization of the course. A lecture series organized to study in depth a selected phase of agriculture not normally associated with one of the existing programs.

Agronomy

AGRO 100 Crops Laboratory. (2) Two laboratory periods a week. Demonstration and application of practices in the identification, distribution and management of field crops.

AGRO 102 Crop Production. (2) Prerequisite AGRO 100 or concurrent enrollment therein. Culture, use, improvement, adaptation, distribution, and history of field crops.

AGRO 103 World Crops and Food Supply. (3) An introduction to the relationship of crops with civilization. The past, present, and future interactions of the biology of crop plants with world affairs and population will be studied. The future impact of crops on world affairs will be emphasized.

AGRO 105 Soil and the Environment. (3) A study of soils as an irreplaceable natural resource, importance of soils in the ecosystem, and analysis of land resource areas in the U.S. Discussion of soils as a pollutant and the pollution of soils by various agents and the role of soil as the medium for storage, decontamination or inactivation of pollutants.

AGRO 202 General Soils. (4) Three lectures and one laboratory period a week. Prerequisite CHEM 103 or permission of instructor. A study of the fundamentals of soils including their origin, development, relation to natural sciences, effect on civilization, physical properties, and chemical properties.

AGRO 398 Senior Seminar. (1) Reports by seniors on current scientific and practical publications pertaining to agronomy.

AGRO 403 Crop Breeding. (3) Prerequisite, BOTN 414 or ZOOL 246. Principles and methods of breeding annual self and cross-pollinated plant and perennial forage species.

AGRO 404 Tobacco Production. (3) Prerequisite, BOTN 100. A study of the history, adaptation, distribution, culture, and improvement of various types of tobacco, with special emphasis on problems in Maryland tobacco production. Physical and chemical factors associated with yield and quality of tobacco will be stressed.

AGRO 405 Turf Management. (3) Two lectures and one laboratory period per week. Prerequisite, BOTN 100. A study of principles and practices of managing turf for lawns, golf courses, athletic fields, playgrounds, airfields and highways for commercial sod production.

AGRO 406 Forage Crop Production. (2) Prerequisite, BOTN 100, AGRO 100 or concurrent enrollment therein. Study of the production and management of grasses and legumes for quality hay, silage, and pasture.

AGRO 407 Cereal Crop Production. (2) Prerequisite, BOTN 100, AGRO 100 or concurrent enrollment therein. Study of the principles and practices of corn, wheat, oats, barley, rye, and soybean production.

AGRO 411 Soil Fertility Principles. (3) Prerequisite, AGRO 202. A study of the chemical, physical, and biological characteristics of soils that are important in growing crops. Soil deficiencies of physical, chemical, or biological nature and their correction by the use of lime, fertilizers, and rotations are discussed and illustrated.

AGRO 412 Commercial Fertilizers. (3) Prerequisite, AGRO 202 or permission of instructor. A study of the manufacturing of commercial fertilizers and their use in soils for efficient crop production.

AGRO 413 Soil and Water Conservation. (3) Two lectures and one laboratory period a week. Prerequisite, AGRO 202 or permission of instructor. A study of the importance and causes of soil erosion, methods of soil erosion control, and the effect of conservation practices on soil-moisture supply. Special emphasis is placed on farm planning for soil and water conservation. The laboratory period will be largely devoted to field trips.

AGRO 414 Soil Classification and Geography. (4) Three lectures and one laboratory period a week. Prerequisite, AGRO 202 or permission of instructor. A study of the genesis, morphology, classification and geographic distribution of soils. The broad principles governing soil formation are explained. Attention is given to the influence of geographic factors on the development and use of the soils in the United States and other parts of the world. The laboratory periods will be largely devoted to the field trips and to a study of soil maps of various countries.

AGRO 415 Soil Survey and Land Use. (3) Two lectures and one laboratory period a week. An introduction to soil survey interpretation as a tool in land use both in agricultural and urban situations. The implications of soil problems as delineated by soil surveys on land use will be considered.

AGRO 417 Soil Physics. (3) Two lectures and one laboratory period a week. Prerequisite, AGRO 202 and a course in physics, or permission of instructor. A study of physical properties of soils with special emphasis on relationship to soil productivity.

AGRO 421 Soil Chemistry. (3) One lecture and two laboratory periods a week. Prerequisite, AGRO 202 or permission of instructor. A study of the chemical composition of soils; cation and anion exchange; acid, alkaline and saline soil conditions; and soil fixation of plant nutrients. Chemical methods of soil analysis will be studied with emphasis on their relation to fertilizer requirements.

AGRO 422 Soil Biochemistry. (3) Two lectures and one laboratory period a week. Prerequisite, AGRO 202, CHEM 104 or consent of instructor. A study of biochemical processes involved in the formation and decomposition of organic soil constituents. Significance of soil-biochemical processes involved in plant nutrition will be considered.

AGRO 423 Soil-Water Pollution. (3) Prerequisite, background in biology and CHEM 104. Reaction and fate of pesticides, agricultural fertilizers, industrial and animal wastes in soil and water will be discussed. Their relation to the environment will be emphasized.

AGRO 451 Cropping Systems. (2) Prerequisite, AGRO 102 or equivalent. The coordination of information from various courses in the development of balanced cropping systems, appropriate to different objectives in various areas of the state and nation.

AGRO 452 Seed Production and Distribution. (2) One lecture and one laboratory period a week. Prerequisite, AGRO 102 or equivalent. A study of seed production, processing, and distribution; federal and state seed control programs; seed laboratory analysis; release of new varieties and maintenance of foundation seed stocks.

AGRO 453 Weed Control. (3) Two lectures and one laboratory period a week. Prerequisite, AGRO 102 or equivalent. A study of the use of cultural practices and chemical herbicides in the control of weeds.

AGRO 499 Special Problems in Agronomy. (1-3) Prerequisites, AGRO 202, 406, 407 or permission of instructor. A detailed study, including a written report of an important problem in agronomy.

Agriculture and Life Science

ALSC 101 Organization and Interrelationships in the Biological World. (3) An introductory lecture course for the non-science major emphasizing the fundamental organization, processes and interdependence of living organisms and the biological effects associated with human influences on the ecosystem.

ALSC 124 Cosmic Evolution. (3) Prerequisites, high school chemistry and biology. Three lectures per week. Especially appropriate for non-science students. The current scientific thinking on the sequence of events from the origin of the universe to the appearance of man. Emphasis on chemical and biological evolution.

American Studies

AMST 201 Introduction to American Studies I. (3) Introduction to American cultural studies, examining the relationship between the self society as revealed in autobiographical writing, 'new journalism' and personal accounts of American culture.

AMST 202 Introduction to American Studies II. (3) An investigation of the concepts of culture as defined by both the humanities and the social sciences and as illuminated by specific artifacts and documents from American civilization. The strategies employed by individuals and academic disciplines to observe and explain the mores, myths, and rituals of American society.

AMST 298 Selected Topics in American Studies. (3) Cultural study of a specific theme or issue involving diversified artifacts and documents from both past and contemporary American experience. Course may be repeated to a maximum of six hours if the subject is different.

AMST 426 Culture and the Arts in America. (3) Prerequisite, junior standing. A study of American institutions, the intellectual and esthetic climate from the Colonial period to the present.

AMST 427 Culture and the Arts in America. (3) Prerequisite, junior standing. A study of American institutions, the intellectual and esthetic climate from the Colonial period to the present.

AMST 436 Readings in American Studies. (3) Prerequisite, junior standing. An historical survey of American values as presented in various key writings.

AMST 437 Readings in American Studies. (3) Prerequisite, junior standing. An historical survey of American values as presented in various key writings.

AMST 446 Popular Culture in America. (3) Prerequisite, junior standing and permission of instructor. A survey of the historical development of the popular arts and modes of popular entertainment in America.

AMST 447 Popular Culture in America. (3) Prerequisite, junior standing and AMST 446. Intensive research in the sources and themes of contemporary American popular culture.

AMST 498 Special Topics in American Studies. (3) Prerequisite: a course in American history, literature, or government, or consent of the instructor. Topics of special interest. Repeatable to a maximum of 6 credits when topics differ.

Animal Science

ANSC 101 Principles of Animal Science. (3) Two lectures and one laboratory period per week. A comprehensive course, including the development of animal science, its contributions to the economy, characteristics of animal products, factors of efficient and economical production and distribution.

ANSC 201 Basic Principles of Animal Genetics. (3) Two lectures and one laboratory period per week. The basic principles and laws of Mendelian genetics as applied to economically important domestic animals. Included will be gene action and interaction, linkage and crossing over, recombination, cytological maps, chromosomal abberrations, mutations, structure of the genetic material and regulation of genetic information.

ANSC 203 Feeds and Feeding. (3) Credit not allowed for ANSC major. Two lectures and one laboratory period per week. Prerequisites, CHEM 103, 104. Elements of nutrition, source, characteristics and adaptability of the various feedstuffs to the several classes of livestock. A study of the composition of feeds, the nutrient requirements of farm animals and the formulation of economic diets and rations for livestock.

ANSC 211 Anatomy of Domestic Animals. (4) Three lectures and one laboratory per week. Prerequisite, ZOOL 101. A systematic gross and microscopic comparative study of the anatomy of the major domestic animals. Special emphasis is placed on those systems important in animal production.

ANSC 212 Applied Animal Physiology. (4) Three lectures and one three-hour laboratory period per week. Prerequisite, ANSC 211 or equivalent. The physiology of domesticated animals with emphasis on functions related to production, and the physiological adaptation to environmental influences.

ANSC 221 Fundamentals of Animal Production. (3) Two lectures and one laboratory period per week. This course deals with the adaptation of beef cattle, sheep, swine and horses to significant and specific uses. Breeding, feeding, management practices and criteria for evaluating usefulness are emphasized.

ANSC 222 Livestock Evaluation. (3) Two lectures and one laboratory period per week. Prerequisite, ANSC 221 or permission of instructor. A study of type and breed characteristics of beef cattle, sheep and swine and the market classes of livestock which best meet present day demands. One field trip of about two days duration is made during which students participate in the annual Eastern Intercollegiate Livestock Clinic.

ANSC 223 Career and Curriculum Planning Seminar. (1). One meeting per week. Presentation of information relating to all specialized areas of the animal sciences with orientation toward career development and curriculum planning. Discussions and reports will be included.

ANSC 226 Man, Culture, Animals. (2) A general study of the importance of animals in the cultural development of man. Historical and contemporary uses of particular animal species will be explored. Environmental limitations to human development which have been overcome by man-animal relationships will be emphasized.

ANSC 230 Introduction to Horse Management. (3) Two lectures and one two-hour laboratory period per week. A general course in horse management for students who intend to work in activities closely related to the horse industry. The basis for the usefulness of horses to individuals and society will be developed by application of the principles of nutrition,

physiology, anatomy, genetics, behavior, and environmental control.

ANSC 242 Dairy Production. (3) Two lectures and one laboratory period per week. Prerequisite, ANSC 101. A comprehensive course in dairy breeds, selection of dairy cattle, dairy cattle nutrients, feeding and management.

ANSC 244 Dairy Cattle Type Appraisal. (1) Freshmen, by permission of instructor. Two laboratory periods. Analysis of dairy cattle type with emphasis on the comparative judging of dairy cattle.

ANSC 252 Introduction to the Diseases of Wildlife. (2) Two lectures per week. Prerequisite, ZOOL 101. The principal diseases of North American wildlife will be briefly considered. For each disease, specific attention will be given to the following: signs evidenced by the affected animal or bird, causative agent, means of transmission and effects of the disease on the population of the species involved. Also included where appropriate is a consideration of the threat that each disease may pose to man or his domestic animals.

ANSC 261 Advanced Poultry Judging. (1) Prerequisite, ANSC 101. One lecture or laboratory period per week. The theory and practice of judging and culling by physical means is emphasized, including correlation studies of characteristics associated with productivity. Contestants for regional collegiate judging competitions will be selected from this class.

ANSC 262 Commercial Poultry Management. (3) Prerequisite, ANSC 101. A symposium of finance, investment. Plant layout. Specialization, purchase of supplies and management problems in baby chick, egg, broiler and turkey production; foremanship, advertising, selling, by-products, production and financial records. Field trips required.

ANSC 265 Fundamentals of Pet Nutrition. (2) Two lecture hours per week. A basic course on the nutrition of those animals commonly kept as household pets. Designed to acquaint students with minimal science background with the basic principles and techniques of animal nutrition.

ANSC 301 Advanced Livestock Evaluation. (2) Two laboratory periods per week. Prerequisites, ANSC 222 and permission of instructor. An advanced course in meat animal evaluation designed to study the relationship and limitations that exist in evaluating breeding and market animals and the relationship between the live market animal and its carcass. Evaluating meat carcasses, wholesale meat cuts and meat grading will be emphasized. The most adept students enrolled in this course are chosen to represent the University of Maryland in intercollegiate judging contests.

ANSC 305 Companion Animal Care. (3) Prerequisites, a semester of zoology or general biology. General information, care, and management of the companion small animals. Species covered include the cat, dog, rodents, lagomorphs, reptiles, amphibians, birds and others as class interest and schedule dictate. Basic description, evolutionary development, breeding, nutritional and environmental requirements, and public health aspects will be presented for each species.

ANSC 332 Horse Management. (3) Prerequisite, ANSC 230. Major topics include nutrition, reproduction, breeding, performance evaluation, basic training and management techniques.

ANSC 337 The Science of Horse Training. (2) Summer only. Prerequisites, ANSC 230, 332, and permission of instructor. Major topics include evaluation of behavioral repertory, use of positive and negative reinforcement, successive approximation, as techniques for the basic training of the horse. The basic training to include teaching an untrained horse to lunge, accept tack, drive, be mounted and perform certain movements while being ridden.

ANSC 350 Ornithology. (4) Three lectures and one three-hour laboratory period per week. Three mandatory field trips. Prerequisites: ZOOL 290 or permission of instructor. Includes systematics, anatomy, physiology, behavior, life histories, ecology, population dynamics, evolution and conservation of birds. May not be taken for credit by students who have credit in ANSC 454.

ANSC 398 Seminar. (1) Prerequisite, approval of the staff. Presentation and discussion of current literature and research work in animal science, or in fish and wildlife management. Repeatable to a maximum of two hours.

ANSC 399 Special Problems in Animal Science. (1-2) Prerequisite, approval of staff. Work assigned in proportion to amount of credit. A course designed for advanced undergraduates in which specific problems relating to animal science will be assigned.

ANSC 401 Fundamentals of Nutrition. (3) Three lectures per week. Prerequisite, CHEM 104; ANSC 212 recommended. A study of the fundamental role of all nutrients in the body including their digestion, absorption and metabolism. Dietary requirements and nutritional deficiency syndromes of laboratory and farm animals and man will be considered.

ANSC 402 Applied Animal Nutrition. (3) Two lectures and one laboratory period per week. Prerequisites, MATH 110, ANSC 401 or permission of instructor. A critical study of those factors which influence the nutritional requirements of ruminants, swine and poultry. Practical feeding methods and procedures used in formulation of economically efficient rations will be presented.

ANSC 403 Applied Animal Nutrition. (3) Two lectures and one laboratory period per week. Prerequisites, MATH 110, ANSC 402 or permission of instructor. A critical study of those factors which influence the nutritional requirements of ruminants, swine and poultry. Practical feeding methods and procedures used in formulation of economically efficient rations will be presented.

ANSC 406 Environmental Physiology. (3) Prerequisites, anatomy and physiology. The specific anatomical and physiological modifications employed by animals adapted to certain stressful environments will be considered. Particular emphasis will be placed on the problems of temperature regulation and water balance. Specific areas for consideration will include: animals in cold (including hibernation), animals in dry heat, diving animals and animals in high altitudes.

ANSC 407 Advanced Dairy Production. (1) An advanced course primarily designed for teachers of vocational agriculture and county agents. It includes a study of the newer discoveries in dairy cattle nutrition, breeding and management.

ANSC 411 Biology and Management of Shellfish. (4) Two lectures and two three-hour laboratory periods each week. Field trips. Identification, biology, management, and culture of commercially-important molluscs and crustacea. Prerequisite, one year of biology or zoology. This course will examine the shellfisheries of the world, but will emphasize those of the northwestern Atlantic Ocean and Chesapeake Bay.

ANSC 412 Introduction to Diseases of Animals. (3) Prerequisite, MICB 200 and ZOOL 101. Two lectures and one laboratory period per week. This course gives basic instruction in the nature of disease: including causation, immunity, methods of diagnosis, economic importance, public health aspects and prevention and control of the common diseases of sheep, cattle, swine, horses and poultry.

ANSC 413 Laboratory Animal Management. (3) A comprehensive course in care and management of laboratory animals. Emphasis will be placed on physiology, anatomy and special uses for the different species. Disease prevention and regulations for maintaining animal colonies will be covered. Field trips will be required.

ANSC 414 Biology and Management of Fish. (4) Prerequisite, one year of biology or zoology. Two lectures and two three-hour laboratories a week. Fundamentals of individual and population dynamics; theory and practice of sampling fish populations; management schemes.

ANSC 416 Wildlife Management. (3) Two lectures and one laboratory. An introduction to the interrelationship of game birds and mammals with their environment, population dynamics and the principles of wildlife management.

ANSC 422 Meats. (3) Two lectures and one laboratory period per week. Prerequisite, ANSC 221. A course designed to give the basic facts about meat as a food and the factors influencing acceptability, marketing, and quality of fresh meats. It includes comparisons of characteristics of live animals with their carcasses, grading and evaluating carcasses as well as wholesale cuts, and the distribution and merchandising of the nation's meat supply. Laboratory periods are conducted in packing houses, meat distribution centers, retail outlets and University meats laboratory.

ANSC 423 Livestock Management. (3) One lecture and two laboratory periods per week. Prerequisite, ANSC 401. Application of various phases of animal science to the management and production of beef cattle, sheep and swine.

ANSC 424 Livestock Management. (3) One lecture and two laboratory periods per week. Prerequisite, ANSC 423. Applications of various phases of animal science to the management and production of beef cattle, sheep and swine.

ANSC 426 Principles of Breeding. (3) Second semester. Three lectures per week. Prerequisites, ANSC 201 or equivalent, ANSC 222, ANSC 423 or 424. Graduate credit (1-3 hours) allowed with permission of instructor. The practical aspects of animal breeding, heredity, variation, selection, development, systems of breeding and pedigree study are considered.

ANSC 432 Horse Farm Management. (3) Prerequisite, ANSC 332 and AREC 410. One 90-minute lecture and one four-hour laboratory period per week. A course to develop the technical and managerial skills necessary for the operation of a horse breeding farm. Herd

health programs, breeding programs and procedures, foaling activities, foot care, weaning programs, and the maintenance of records incidental to each of these activities.

ANSC 442 Dairy Cattle Breeding. (3) Two lectures and one laboratory period per week. Prerequisites, ANSC 242, and ANSC 201. A specialized course in breeding dairy cattle. Emphasis is placed on methods of evaluation and selection, systems of breeding and breeding programs.

ANSC 444 Analysis of Dairy Production Systems. (3) Prerequisites, AGEC 406 and ANSC 203 or 214, or permission of instructor. The business aspects of dairy farming including an evaluation of the costs and returns associated with each segment. The economic impact of pertinent management decisions is studied. Recent developments in animal nutrition and genetics, agricultural economics, agricultural engineering, and agronomic practices are discussed as they apply to management of a dairy herd.

ANSC 446 Physiology of Mammalian Reproduction. (3) Two lectures and one three-hour laboratory period per week. Prerequisite, ZOOL 422 or ANSC 212. Anatomy and physiology of reproductive processes in wild and domesticated mammals.

ANSC 452 Avian Physiology. (2) (Alternate even years). One three-hour laboratory period per week. Prerequisites, a basic course in animal physiology. The basic physiology of the bird is discussed, excluding the reproductive system. Special emphasis is given to physiological differences between birds and other vertebrates.

ANSC 462 Physiology of Hatchability. (1) Two lectures and one laboratory period per week. Prerequisite, ZOOL 421 or 422. The physiology of embryonic development as related to principles of hatchability and problems of incubation encountered in the hatchery industry are discussed.

ANSC 463 Nutrition Laboratory. (2) Prerequisite, ANSC/NUSC 401 or concurrent registration.Six hours of laboratory per week. Digestibility studies with ruminant and monogastric animals, proximate analysis of various food products, and feeding trials demonstrating classical nutritional deficiencies in laboratory animals.

ANSC 464 Poultry Hygiene. (3) Two lectures and one laboratory period per week. Prerequisites, MICB 200 and ANSC 101. Virus, bacterial and protozoan diseases, parasitic diseases, prevention, control and eradication.

ANSC 466 Avian Anatomy. (3) Two lectures and one laboratory period per week. Prerequisite, ZOOL 102. Gross and microscopic structure, dissection and demonstration.

ANSC 467 Poultry Breeding and Feeding. (1) This course is designed primarily for teachers of vocational agriculture and extension service workers. The first half will be devoted to problems concerning breeding and the development of breeding stock. The second half will be devoted to nutrition.

ANSC 477 Poultry Products and Marketing. (1) This course is designed primarily for teachers of vocational agriculture and county agents. It deals with the factors affecting the quality of poultry products and with hatchery management problems, egg and poultry grading, preservation problems and market outlets for Maryland poultry.

ANSC 480 Special Topics in Fish and Wildlife Management. (3) Three lectures. Analysis of various state and federal programs related to fish and wildlife management. This would include: fish stocking programs, Maryland deer management program, warm water fish management, acid drainage problems, water quality, water fowl management, wild turkey management and regulations relative to the administration of these programs.

ANSC 487 Special Topics in Animal Science. (1) Prerequisite, permission of instructor. This course is designed primarily for teachers of vocational agriculture and extension service personnel. One primary topic to be selected mutually by the instructor and students will be presented each session.

Anthropology

ANTH 101 Introduction to Anthropology — Archaeology and Physical Anthropology. (3) May be taken for credit in the general education program. General patterns of the development of human culture; the biological and morphological aspects of man viewed in his cultural setting.

ANTH 102 Introduction to Anthropology — Cultural Anthropology and Linguistics. (3) Social and cultural principles as exemplified in ethnographic descriptions. The study of language within the context of anthropology.

ANTH 221 Man and Environment. (3) A geographical introduction to ethnology, emphasizing the relations between cultural forms and natural environment.

ANTH 241 Introduction to Archaeology. (3) A survey of the basic aims and methods of archeological field work and interpretation, with emphasis on the reconstruction of prehistoric ways of life.

ANTH 261 Introduction to Physical Anthropology. (3) The biological evolution of man, including the process of race formation, as revealed by the study of the fossil record and observation of modern forms.

ANTH 271 Language and Culture. (3) A non-technical introduction to linguistics, with special consideration of the relations between language and other aspects of culture. (Listed also as LING 101).

ANTH 298 Special Topics in Anthropology. (3) Anthropological perspectives on selected topics of broad general interest. Course may be repeated to a maximum of six credits when course content differs.

ANTH 361 Human Evolution and Fossil Man. (3) A survey of the basic principles of human evolution as seen by comparative anatomic study of fossil specimens.

ANTH 371 Introduction to Linguistics. (3) Introduction to the basic concepts of modern descriptive linguistics. Phonology, morphology, syntax. Examinations of the methods of comparative linguistics, internal reconstruction, dialect geography.

ANTH 389 Research Problems. (1-6) Prerequisite, permission of instructor. Introductory training in anthropological research methods. The student will prepare a paper embodying the results of an appropriate combination of research techniques applied to a selected problem in any field of anthropology.

ANTH 397 Anthropological Theory. (3) Prerequisite, permission of instructor. A survey of the historical development and current emphasis in the theoretical approaches of all fields of anthropology, providing an integrated frame of reference for the discipline as a whole.

ANTH 401 Cultural Anthropology — Principles and Processes. (3) Prerequisite, ANTH 101, 102, or 221. An examination of the nature of human culture and its processes, both historical and functional. The approach will be topical and theoretical rather than descriptive.

ANTH 402 Cultural Anthropology — World Ethnography. (3) Prerequisite, ANTH 101, 102, or 221. A descriptive study of culture areas of the world through an examination of the ways of selected representative societies.

ANTH 412 Peoples and Cultures of Oceania. (3) A survey of the cultures of Polynesia, Micronesia, Melanesia and Australia. Theoretical and cultural-historical problems will be emphasized.

ANTH 414 Ethnology of Africa. (3) Prerequisites, ANTH 101 and 102. The native peoples and cultures of Africa and their historical relationships, with emphasis on that portion of the continent south of the Sahara.

ANTH 417 Peoples and Cultures of the Far East. (3) A survey of the major sociopolitical systems of China, Korea and Japan. Major anthropological questions will be dealt with in presenting this material.

ANTH 423 Ethnology of the Southwest. (3) Prerequisites, ANTH 101 and 102. Culture history, economic and social institutions, religion, and mythology of the Indians of the Southwest United States.

ANTH 424 Ethnology of North America. (3) Prerequisites, ANTH 101 and 102. The native people and cultures of North America north of Mexico and their historical relationships, including the effects of contact with European-derived populations.

ANTH 426 Ethnology of Middle America. (3) Prerequisite, ANTH 101 and 102. Cultural background and modern social, economic and religious life of Indian and Mestizo groups in Mexico and Central America; processes of acculturation and currents in cultural development.

ANTH 431 Social Organization of Primitive Peoples. (3) Prerequisites, ANTH 101 and 102. A comparative survey of the structures of non-literate and folk societies, covering both general principles and special regional developments.

ANTH 434 Religion of Primitive Peoples. (3) Prerequisites, ANTH 101 and 102. A survey of the religious systems of primitive and folk societies, with emphasis on the relation of religion to other aspects of culture.

ANTH 436 Primitive Technology and Economy. (3) A survey of technology, food economy and general economic processes in non-industrial societies.

ANTH 437 Politics and Government in Primitive Society. (3) A combined survey of politics in human societies and of important anthropological theories concerning this aspect of society.

ANTH 441 Archaeology of the Old World. (3) Prerequisite, ANTH 101 or 241. A survey of the archaeological materials of Europe, Asia and Africa, with emphasis on chronological and regional interrelationships.

ANTH 451 Archaeology of the New World. (3) Prerequisite, ANTH 101 or 241. A survey of the archaeological materials of North and South America with emphasis on chronological and regional interrelationships.

ANTH 461 Human Osteology Laboratory. (3) Prerequisite, ANTH 101. A laboratory study of the human skeleton, its morphology, measurement, and anatomic relationships.

ANTH 462 Primate Anatomy Laboratory. (3) Prerequisite, ANTH 101. The gross anatomy of non-human primates. Laboratory dissection of various primate cadavers under supervision. Occasional lectures.

ANTH 463 Primate Studies. (3) Prerequisite, ANTH 101. A combination lecture and laboratory examination of non-human primates. Major studies of various types that have been undertaken in the laboratory and in the field.

ANTH 465 Human Growth and Constitution. (3) Prerequisite, ANTH 101. A laboratory study of the growth, development and age changes in the human body from conception through old age, including gross photographic, radiographic, and microscopic study of growth and variation.

ANTH 466 Forensic Anthropology Laboratory. (3) Prerequisite, ANTH 461 or permission of the instructor. A laboratory study of the methods used to identify human remains by anthropological techniques and discussion of the role of the anthropologist in medico-legal investigation.

ANTH 467 Human Population Biology Laboratory. (3) Prerequisite, ANTH 101. A laboratory study of human population genetics, dynamics and variation, including anthropological seriology, biochemistry, dermatoglyphics and hair microscopy.

ANTH 498 Field Methods in Ethnology. (1-6) Field training in the collection and recording of ethnological data.

ANTH 499 Field Methods in Archaeology. (1-6) Field training in the techniques of archaeological survey and excavation.

Applied Design

APDS 101 Fundamentals of Design. (3) Knowledge of basic art elements and principles gained through design problems which employ a variety of media.

APDS 102 Design II. (3) Prerequisite, APDS 101. Continued exploration of design as a means of visual expression with added emphasis on color and lighting.

APDS 103 Design III — Three-Dimensional Design. (3) Three studio periods. Prerequisites, APDS 101, 102. Creative efforts directed to discriminating use of form, volume, depth, and movement.

APDS 104 Survey of Art History. (3) A rapid survey of western culture expressed through and influenced by the visual arts: monumental and residential architecture; furniture, textiles and costume; painting and sculpture.

APDS 210 Presentation Techniques. (3) Three studio periods. Prerequisites, APDS 101, 102 or equivalent. Comparative approach to basic presentation techniques used in the several areas of commercial design.

APDS 211 Action Drawing — Fashion Sketching. (3) Three studio periods. Prerequisites, APDS 101 and consent of instructor. Study of the balance and proportion of the human figure. Sketch techniques applied to action poses and fashion drawing in soft and lithograph pencils, pastels, water color, ink. Drawing from model.

APDS 212 Design Workshop for Transfers. (5) Prerequisite, APDS 101 or equivalent. Provides opportunity for transfer students to remove deficiencies in lower-level design courses. Study of color, lighting and presentation techniques. May be taken no later than one semester after transfer into department.

APDS 220 Introduction to Fashion Design. (3) Three studio periods. Prerequisite, APDS 101 or equivalent. Basic fashion figure drawing. Original designs rendered in transparent and opaque water color, soft pencil, pastels, and ink. Primarily for nonmajors.

APDS 230 Silk Screen Printing. (3) Three laboratory periods. Prerequisites, APDS 101, 102 or equivalent. Use of silk screen processes in execution of original designs for commercial production.

APDS 237 Photography. (2) One lecture, three hours laboratory. Prerequisites, APDS 101, 102 or equivalent. Study of fundamental camera techniques. Exploration of the expressive possibilities in relation to the field of design and visual communication.

APDS 320 Fashion Illustration. (3) First semester. Three studio periods. Prerequisites, APDS 101, 102, 103, 210, 211. Fabric and clothing structure as they relate to illustration. Opportunity to explore rendering styles and techniques appropriate to reproduction methods currently used in advertising. Guidance in development of individuality in presentations.

APDS 321 Fashion Design and Illustration. (3) Three studio periods. Prerequisite, APDS 320. Design and illustration of fashions appropriate to the custom market and to mass production.

APDS 322 Advanced Costume. (4) Prerequisite, APDS 320 or 321. Advanced problems in fashion illustration or design. Problems chosen with consent of instructor.

APDS 330 Typography and Lettering. (3) Three studio periods. Prerequisites, APDS 101, 102. Experience in hand lettering techniques as a means of understanding lettering styles in design composition. Recognition of type faces used in advertisement, book and magazine layout. Effect of printing processes on design choices.

APDS 331 Advertising Layout. (3) Three studio periods. Prerequisites, APDS 330, EDIN 101A. Design of advertising layouts from initial idea to finished layout. Typography and illustration as they relate to reproduction processes used in direct advertising.

APDS 332 Display Design. (3) Three studio periods. Prerequisites, EDIN 101A, APDS 330 or equivalent. Application of design principles to creative display appropriate to exhibits, design shows, merchandising. Display construction.

APDS 337 Advanced Photography. (2) Two studio periods. Prerequisite, APDS 237. Composition, techniques and lighting applicable to illustration, documentation, advertising design, and display.

APDS 380 Professional Seminar. (2) Two lecture-discussion periods. Prerequisite, junior standing or consent of instructor. Exploration of professional and career opportunities, ethics, practices, professional organizations. Portfolio evaluation.

APDS 430 Advanced Problems in Advertising Design. (3) Two studio periods. Prerequisite, APDS 331. Advanced problems in design and layout planned for developing competency in one or more areas of advertising design.

APDS 431 Advanced Problems in Advertising Design. (3) Two studio periods. Prerequisite, APDS 430. Advanced problems in design and layout planned for developing competency in one or more areas of advertising design.

APDS 437 Advanced Photography. (3) Three studio periods. Continuation of APDS 337.

APDS 499 Individual Problems in Applied Design. (3-4) A — Advertising. B — Costume. Open only to advanced students who, with guidance can work independently. Written consent of instructor.

Architecture

ARCH 170 Introduction to the Built Environment. (3) Introduction of (1) conceptual, perceptual, behavioral and technical aspects of the environment; and (2) methods of analysis, problem solving and implementation. For students not majoring in architecture. Prerequisites, none. Lecture, seminar, 3 hours per week.

ARCH 200 Basic Environmental Design. (4) Introduction to the processes of visual and architectural design, including the study of visual design fundamentals. Field problems involving the student in the study of actual developmental problems. Lecture, studio, 9 hours per week.

ARCH 201 Basic Environmental Design. (4) Prerequisite, ARCH 200 with a grade of C or better. Introduction to the processes of visual and architectural design, including the study of visual design fundamentals. Field problems involving the student in the study of actual developmental problems. Lecture and studio, 9 hours per week.

ARCH 214 Materials and Methods of Construction I. (2) Two lectures per week. Architecture students only or permission of instructor. An introduction to the materials of construction, their properties, attributes and deficiencies.

ARCH 215 Materials and Methods of Construction II. (2) Two lectures per week. Architecture students only or permission of instructor. Describes the methods by which the architect combines materials to produce structural systems.

ARCH 220 History of Architecture I. (3) Prerequisite, ARCH 220. Continuation of survey of architectural history. Lecture three hours per week.

ARCH 221 History of Architecture II. (3) Prerequisite, ARCH 220. Continuation of survey of architectural history. Lecture three hours per week.

ARCH 240 Basic Photography. (2) Provides a student with the basic concepts of clarity and organization on a two-dimensional surface and stresses photography as a tool for visual communication. Lecture one hour per week, three hours of laboratory per week.

ARCH 242 Drawing I. (2) Introduces the student to basic techniques of sketching and use of various media.

ARCH 300 Architecture Studio I. (4) Prerequisites, ARCH 201 with a grade of C or better. Corequisite, ARCH 310. Develops a basic understanding of the elements of environmental control, basic structural systems, building processes materials, and the ability to manipulate them. Lecture and studio, 9 hours per week.

ARCH 301 Architecture Studio II. (4) Prerequisite, ARCH 300 with a grade of C or better. Corequisite, ARCH 311. Develops a basic understanding of the forms generated by different structural systems, environmental

controls and methods of construction. Lecture and studio, 9 hours per week.

ARCH 310 Architectural Science and Technology I. (4) Prerequisite, ARCH 201 with a grade of C or better, ARCH 215, MATH 221, and PHYS 121. Corequisite, ARCH 300. Introduction to architectural science and technology treating principles of structures, environmental mechanical controls, and construction. Lecture and studio, 6 hours per week.

ARCH 311 Architectural Science and Technology II. (4) Prerequisite, ARCH 300 and ARCH 310 with a grade of C or better. Corequisite, ARCH 301. Develops working knowledge of the design principles and parameters of three areas of architectural science and technology structures, environmental-mechanical controls, and construction. Lecture and studio, 6 hours per week.

ARCH 314 Computer Applications in Architecture. (3) Prerequisite, ARCH 201 or permission of instructor. Introduction to computer programming and utilization, with emphasis on architectural applications. Lecture, laboratory.

ARCH 320 Studies in Ancient Architecture. (3) The origins and development of architecture of the ancient world from the earliest times through the fall of the Roman Empire with emphasis upon Egypt, the Near East and the classical world.

ARCH 322 Studies in Medieval Architecture. (3) Limited to architecture students or by permission of the instructor. Architectural innovations from the Carolingian through the Gothic periods. Lecture, 3 hours per week.

ARCH 324 Studies in Renaissance Architecture. (3) Limited to architecture students or by permission of the instructor. Study of Renaissance architectural principles and their development in the Baroque period. Lecture 3 hours per week.

ARCH 326 Studies in Modern Architecture. (3) Limited to architecture students or by permission of the instructor. Study of architectural problems from 1750 to the present. Lecture, 3 hours per week.

ARCH 340 Advanced Photography. (2) Prerequisite, ARCH 240. Allows the student to investigate independently areas of photographic communication not covered in the basic course. Lecture, 1 hour per week; 3 hours lab.

ARCH 342 Studies in Visual Design. (3) Studio work at an intermediate level in visual design divorced from architectural problem solving. Prerequisite, ARCH 201. Lecture, studio work, 3 hours per week.

ARCH 350 Theory of Urban Form. (3) Urban spatial forms of the past and present; theories of design of complexes of buildings, urban space and communities. Lecture 3 hours per week.

ARCH 352 The Architect in the Community. (3) The architect's role in the social and political dynamics of urban environmental design decision-making processes, including study of determination and expression of user needs, community aspirations, formal and informal program and design review processes. Seminar, 1 hour per week, field observation, approximately 3 hours per week.

ARCH 360 Basic Site Analysis. (3) Study of criteria and principles essential to the support of natural systems in physical site development. For architecture students or by permission of instructor. Lecture-lab, 3 hours per week.

ARCH 370 Theories and Literature of Architecture. (3) Limited to architecture students or by permission of the instructor. Provides an understanding of some historical and present theories of architectural design readings and seminar discussions. Lecture, 3 hours per week.

ARCH 372 Signs, Symbols and Messages in Architecture. (3) Limited to architecture students or by permission of the instructor. Class limited to 15-20 students. Signs and symbols in buildings and cities, messages conveyed and purposes for conveying these messages. Readings, photographic reports and minor problem-solving assignments. Lecture, three hours per week.

ARCH 374 Computer Aided Environmental Design. (3) Applications of computer-aided design in architecture, using existing problem-solving routines and computer graphic techniques. Prerequisite, ARCH 201, CMSC 103. Lecture, 3 hours per week.

ARCH 376 The Architectural Program as Functional Form Generator. (3) A study of architectural programming as derived from functional needs of man in his environment. Analysis, synthesis and evaluation of categories of needs with concentration on human response to forms generated by programs with emphasis on non-quantifiable human needs. Architecture majors or by permission of the instructor. Lectures, seminars, field trips, 3 hours per week.

ARCH 400 Architecture Studio III. (4) Prerequisites, ARCH 301 with a grade of C or better, and ARCH 311. Corequisite, ARCH 410, except by permission of the dean. Continuation of design studio, with emphasis on comprehensive building design and introduction to urban design factors. Lecture and studio 9 hours per week.

ARCH 401 Architecture Studio IV. (4) Prerequisites, ARCH 400 with a grade of C or better and ARCH 410. Corequisite, ARCH 411, except by permission of the dean. Continuation of design studio with emphasis on urban design factors. Lecture and studio, 9 hours per week.

ARCH 410 Architectural Science and Technology III. (4) Prerequisites, ARCH 301 and ARCH 311 with a grade of C or better. Corequisite, ARCH 400, except by permission of the dean. Application of principles in architectural structures, environmental controls and construction. Lecture and studio, 6 hours per week.

ARCH 411 Architectural Science and Technology IV. (4) Prerequisites, ARCH 400 and ARCH 410 with a grade of C or better. Corequisite, ARCH 401, except by permission of the dean. Application of principles and further analysis of systems and hardware in architectural structures, environmental controls and construction. Lecture and studio, 6 hours per week.

ARCH 413 Structural Systems in Architecture. (3) Theory and application of selected complex structural systems as they relate to architectural decisions. Prerequisite, ARCH 410 or by permission of the instructor. Seminar, 3 hours per week.

ARCH 414 Solar Energy Applications for Buildings. (3) Prerequisites, ARCH 311, or ENME 321, or permission of instructor. Methods of utilizing solar energy to provide heating, cooling, hot water, and electricity for buildings and related techniques for reducing energy consumption. Crosslisted as ENME 414.

ARCH 418 Independent Studies in Architectural Science. (1-6) Repeatable to a maximum of six credits. Independent research in architectural science and technology.

ARCH 420 History of American Architecture. (3) Survey history of American architecture from the 17th century to the present. Lecture, 3 hours per week.

ARCH 421 Seminar in American Architecture. (3) Advanced investigation of historical problems in American architecture. Readings, discussions, and papers. Prerequisite, ARCH 420 or permission of instructor.

ARCH 422 French Architecture 1750-1800. (3) French architectural theory and practice of the second half of the eighteenth century. A reading knowledge of French will be required. Colloquium and independent research. By permission of the instructor.

ARCH 424 History of Russian Architecture. (3) Survey history of Russian architecture from the 10th century to the present. Lecture, 3 hours per week.

ARCH 426 Readings in Contemporary Architecture. (3) Prerequisite, ARCH 326. Readings and analysis of recent architectural criticism. Seminar, three hours per week.

ARCH 428 Selected Topics in Architectural History. (3) Special topics in the history of architecture, repeatable to a maximum of six credits provided the subject matter is different.

ARCH 429 Directed Studies in Architectural History (1-3) Enrollment limited to advanced undergraduate and graduate students. Project proposals must receive a recommendation from the curriculum committee of the school of architecture and approval of the dean of the school prior to registration. Repeatable to a maximum of six credits.

ARCH 430 Problems and Methods of Architectural Preservation. (3) Prerequisite, ARCH 420 or by permission of instructor. Examination of social, cultural, and economic values affecting the theory and practice of architectural preservation in America, with emphasis upon the rationale and methods for the documentation, evaluation, and utilization of existing architectural resources. Field trips.

ARCH 438 Selected Topics in Architectural Preservation. (3) By permission of the instructor. Repeatable to a maximum of nine credits provided the subject matter is different.

ARCH 439 Directed Studies in Architectural Preservation. (1-3) Enrollment limited to advanced undergraduates. Projects must receive a recommendation from the curriculum committee of the school of architecture and approval of the dean of the school prior to registration. Repeatable to a maximum of six credits.

ARCH 447 Advanced Seminar in Photography. (3) Prerequisites, ARCH 340 or APDS 337 or JOUR 351; and consent of instructor. Advanced study of photographic criticism through empirical methods, for students proficient in photographic skills. Photographic assignments, laboratory, seminar, 3 hours per week.

ARCH 450 Introduction to Urban Planning. (3) Introduction to city planning, theory, methodology and techniques, dealing with normative, urban, structural, economic, social

aspects of the city; urban planning as a process. Architectural majors or by permission of the instructor. Lecture, seminar, 3 hours per week.

ARCH 451 Urban Design Seminar. (3) Prerequisite, ARCH 350 or permission of the instructor. Advanced investigation into problems of analysis and evaluation of the design of urban areas, spaces and complexes with emphasis on physical and social considerations, effects of public policies, through case studies. Field observations.

ARCH 472 Economic Determinants of Architecture. (3) Introduction of economic aspects of present day architecture: government policy, land evaluation, and project financing; construction materials and labor costs; cost analysis and control systems. Architecture majors, except by permission of instructor. Lecture, seminar, 3 hours per week.

ARCH 478 Directed Studies in Architecture. (1-4) Directed study under individual faculty guidance with enrollment limited to advanced undergraduate students. Project proposals must receive a recommendation from the school curriculum committee and approval of the dean of the school prior to registration. Public oral presentation to the faculty of a final report of project will be required at final submission for credit.

ARCH 500 Advanced Topical Problems in Architecture I. (6) Prerequisite, ARCH 401 with a grade of C or better. Offers several studio options in advanced topical problems from among which the student selects one. Studies are structured under generic titles and include lectures, field trips, and assigned readings as well as directed independent work. Offered fall term only. Lecture and studio 12 hours per week. Architecture majors only.

ARCH 501 Advanced Topical Problems in Architecture II. (6) Prerequisite, ARCH 500 with a grade of C or better. Offers several studio options in advanced topical problems from among which the student selects one. Studies are structured under generic titles and include lectures, field trips, assigned readings as well as directed independent work. Offered spring term only. Lecture and studio 12 hours per week.

ARCH 502 Thesis Proseminar. (3) Directed research and preparation of program for required undergraduate thesis to be undertaken in final semester of program. Prerequisite, ARCH 401 with grade of C or better. Seminar, three hours per week.

ARCH 512 Advanced Structural Analysis in Architecture. (3) Qualitative and quantitative analysis and design of selected complex structural systems and methods. Prerequisite, ARCH 411. Labs, field trips, 3 hours per week.

ARCH 514 Environmental Systems in Architecture. (3) Qualitative analysis of selected environmental systems as design determinants. Prerequisite, ARCH 411. Lecture, lab, 3 hours per week.

ARCH 570 Introduction to Professional Management. (2) Introduction to architectural professional practice management, including social, organizational project management, legal and cost-control aspects of the performance of complex, comprehensive environmental design services. Prerequisite, ARCH 401. Lecture, 2 hours per week..

Agricultural and Resource Economics

AREC 240 Environment and Human Ecology. (3) Pollution and human crowding in the modern environment. Causes and ecological costs of these problems. Public policy approaches to the solution of problems in environment and human ecology.

AREC 250 Elements of Agricultural and Resource Economics. (3) An introduction to economic principles of production, marketing, agricultural prices and incomes, farm labor, credit, agricultural policies, and government programs.

AREC 251 Marketing of Agricultural Products. (3) The development of marketing, its scope, channels, and agencies of distribution, functions, costs, methods used and services rendered.

AREC 365 World Hunger, Population, and Food Supplies. (3) An introduction to the problem of world hunger and possible solutions to it. World demand, supply, and distribution of food. Alternatives for leveling off world food demand, increasing the supply of food, and improving its distribution. Environmental limitations to increasing world food production.

AREC 398 Seminar. (1) Students will obtain experience in the selection, preparation and presentation of economic topics and problems which will be subjected to critical analysis.

AREC 399 Special Problems. (1-2) Concentrated reading and study in some phase of problem in agricultural economics.

AREC 404 Prices of Agricultural Products. (3) An introduction to agricultural price behavior. Emphasis is placed on the use of price information in the decision-making process, the relation of supply and demand in determining agricultural prices, and the relation of prices to grade, time, location, and stages of processing in the marketing system. The course includes elementary methods of price analysis, the concept of parity and the role of price support programs in agricultural decisions.

AREC 406 Farm Management. (3) The organization and operation of the farm business to obtain an income consistent with family resources and objectives. Principles of production economics and other related fields are applied to the individual farm business. Laboratory period will be largely devoted to field trips and other practical exercises.

AREC 407 Financial Analysis of the Farm Business. (3) Application of economic principles to develop criteria for a sound farm business, including credit source and use, preparing and filing income tax returns, methods of appraising farm properties, the summary and analysis of farm records, leading to effective control and profitable operation of the farm business.

AREC 410 Horse Industry Economics. (3) Prerequisite, ANSC 230 and 232. An introduction to the economic forces affecting the horse industry and to the economic tools required by horse farm managers, trainers, and others in the industry.

AREC 414 Introduction to Agricultural Business Management. (3) The different forms of businesses are investigated. Management functions, business indicators, measures of performance, and operational analysis are examined. Case studies are used to show applications of management techniques.

AREC 427 The Economics of Marketing Systems for Agricultural Commodities. (3) Basic economic theory as applied to the marketing of agricultural products, including price, cost, and financial analysis. Current developments affecting market structure including effects of contractual arrangement, vertical integration, governmental policies and regulation.

AREC 432 Introduction to Natural Resources Policy. (3) Development of natural resource policy and analysis of the evolution of public intervention in the use of natural resources. Examination of present policies and of conflicts between private individuals, public interest groups, and government agencies.

AREC 445 World Agricultural Development and the Quality of Life. (3) An examination of the key aspects of the agricultural development of less developed countries related to resources, technology, cultural and social setting, population, infrastructure, incentives, education, and government. Environmental impact of agricultural development, basic economic and social characteristics of peasant agriculture, theories and models of agricultural development, selected aspects of agricultural development planning.

AREC 452 Economics of Resource Development. (3) Economic, political, and institutional factors which influence the use of land resources. Application of elementary economic principles in understanding social conduct concerning the development and use of natural and man-made resources.

AREC 453 Economic Analysis of Natural Resources. (3) Rational use and reuse of natural resources. Theory and methodology of the allocation of natural resources among alternative uses. Optimum state of conservation, market failure, safe minimum standard, and cost-benefit analysis.

AREC 484 Introduction to Econometrics in Agriculture. (3) An introduction to the application of econometric techniques to agricultural problems with emphasis on the assumptions and computational techniques necessary to derive statistical estimates, test hypotheses, and make predictions with the use of single equation models. Includes linear and non-linear regression models, internal least squares, discriminant analysis and factor analysis.

AREC 485 Applications of Mathematical Programming in Agriculture, Business, and Economic Analysis. (3) This course is designed to train students in the application of mathematical programming (especially linear programming) to solve a wide variety of problems in agriculture, business and economics. The primary emphasis is on setting up problems and interpreting results. The computational facilities of the computer science center are used extensively.

AREC 489 Special Topics in Agricultural and Resource Economics. (3) Repeatable to a maximum of 9 credits.

AREC 495 Honors Reading Course in Agricultural and Resource Economics I. (3) Selected readings in political and economic theory from 1700 to 1850. This course develops a basic understanding of the development of economic and political thought as a foundation for understanding our present society and its cultural heritage. Prerequisite, acceptance in the honors program of the department of Agricultural and Resource Economics.

AREC 496 Honors Reading Course in Agricultural and Resource Economics II. (3) Selected readings in political and economic theory from 1850 to the present. This course

continues the development of a basic understanding of economic and political thought begun in AREC 495 by the examination of modern problems in agricultural and resource economics in the light of the material read and discussed in AREC 495 and AREC 496. Prerequisite: successful completion of AREC 495 and registration in the honors program of the department of Agricultural and Resource Economics.

Air Science

ARSC 100 General Military Course (Freshmen). (1) General military course — freshman year, ARSC 100 and 101. In the first two years, cadets meet academic classes once per week. In addition, they receive one hour of corps training each week.

ARSC 101 General Military Course (Freshmen). (1) General military course — freshman year, ARSC 100 and 101. In the first two years, cadets meet academic classes once per week. In addition, they receive one hour of corps training each week.

ARSC 200 General Military Course (Sophomores). (1) General military course — sophomore year, ARSC 200 and 201. In the first two years, cadets meet academic classes once per week. In addition, they receive one hour of corps training each week.

ARSC 201 General Military Course (Sophomores). (1) General military course — sophomore year, ARSC 200 and 201. In the first two years, cadets meet academic classes once per week. In addition, they receive one hour of corps training each week.

ARSC 300 Professional Officer Course (Juniors). (3) The growth and development of aerospace power. Requires three class hours, plus one hour of corps training per week.

ARSC 301 Professional Officer Course (Juniors). (3) The growth and development of aerospace power. Requires three class hours, plus one hour of corps training per week.

ARSC 302 Professional Officer Course (Seniors). (3) The professional officer. Requires three class hours, plus one hour of corps training per week.

ARSC 303 Professional Officer Course (Seniors). (3) The professional officer. Requires three class hours, plus one hour of corps training per week.

Art Education

ARTE 100 Fundamentals of Art Education. (3) Two hours of laboratory and two hours of lecture per week. Fundamental principles of the visual arts for teaching on the elementary level. Elements and principles of design and theory of color. Studio practice in different media.

Art History

ARTH 100 Introduction to Art. (3) Basic tools of understanding visual art. This course stresses major approaches such as techniques, subject matter, form, and evaluation. Architecture, sculpture, painting, and graphic arts will be discussed. Required of all art majors in the first year.

ARTH 260 History of Art. (3) A survey of western art as expressed through architecture, sculpture and painting. Prehistoric times to Renaissance.

ARTH 261 History of Art. (3) A survey of western art as expressed through architecture, sculpture and painting from Renaissance to the present.

ARTH 284 Introduction to African Art. (3) General concepts preparing the student for a better understanding of African cultures through an appreciation of their art.

ARTH 320 Masterpieces of Painting. (3) A study of the contributions of a few major painters, ranging from Giotto to Titian.

ARTH 321 Masterpieces of Painting. (3) A study of the contributions of a few major painters, ranging from El Greco to Picasso.

ARTH 330 Masterpieces of Sculpture. (3) A study of the contributions of a few major sculptors, ranging from Polykleitos to Ghiberti.

ARTH 331 Masterpieces of Sculpture. (3) A study of the contributions of a few major sculptors, ranging from Ghiberti to Moore.

ARTH 338 Special Topics in Art and Music. (3) Open to non-majors and majors in art or music; listed also as MUSC 338. Repeatable to a maximum of 6 credits.

ARTH 340 Masterpieces of Architecture. (3) A study of great architecture from Stonehenge to the cathedral at Pisa.

ARTH 341 Masterpieces of Architecture. (3) A study of great architecture from Abbaye-Aux-Hommes to Dulles Airport.

ARTH 402 Classical Art. (3) Architecture, sculpture and painting in the classical cultures. First semester will stress Greece.

ARTH 403 Classical Art. (3) Architecture, sculpture and painting in the classical cultures. Second semester will stress Rome.

ARTH 404 Bronze Age Art. (3) Art of the Near East, Egypt and Aegean.

ARTH 406 Art of the East. (3) Architecture, sculpture and painting. First semester will stress India.

ARTH 407 Art of the East. (3) Architecture, sculpture and painting. Second semester will stress China and Japan.

ARTH 410 Early Christian — Early Byzantine Art. (3) Sculpture, painting, architecture, and the minor arts from about 312 to 726 A.D.

ARTH 411 Byzantine Art: 726-1453. (3) Sculpture, painting, architecture and the minor arts from 726 to 1453 A.D.

ARTH 412 Medieval Art. (3) Architecture, sculpture and painting in the Middle Ages. First semester will stress Romanesque.

ARTH 413 Medieval Art. (3) Architecture, sculpture and painting in the Middle Ages. Second semester will stress the Gothic period.

ARTH 416 Northern European Painting in the 15th Century. (3) Painting in the Netherlands, France and Germany.

ARTH 417 Northern European Painting in the 16th Century. (3) Painting in the Netherlands, France and Germany.

ARTH 422 Early Renaissance Art in Italy. (3) Architecture, sculpture and painting from about 1400 to 1430.

ARTH 423 Early Renaissance Art in Italy. (3) Architecture, sculpture and painting from about 1430 to 1475.

ARTH 424 High Renaissance Art in Italy. (3) Architecture, sculpture and painting from about 1475 to 1500.

ARTH 425 High Renaissance Art in Italy. (3) Architecture, sculpture and painting from about 1500 to 1525.

ARTH 430 European Baroque Art. (3) Architecture, sculpture and painting of the major southern European centers in the 17th century.

ARTH 431 European Baroque Art. (3) Architecture, sculpture and painting of the major northern European centers in the 17th century

ARTH 434 French Painting. (3) French painting from 1400 to 1600. From Fouquet to Poussin.

ARTH 435 French Painting. (3) French painting from 1600 to 1800. From Le Brun to David.

ARTH 440 19th Century European Art. (3) Architecture, sculpture and painting in Europe from Neo-Classicism to Romanticism.

ARTH 441 19th Century European Art. (3) Architecture, sculpture and painting in Europe from Realism, to Impressionism and Symbolism.

ARTH 445 Impressionism and Neo-Impressionism. (3) Prerequisite, ARTH 260, 261 or consent of instructor. History of Impressionism and Neo-Impressionism: artists, styles, art theories, criticism, sources and influence on 20th century.

ARTH 450 20th Century Art. (3) Painting, sculpture and architecture from the late 19th century to 1920.

ARTH 451 20th Century Art. (3) Painting, sculpture and architecture from 1920 to the present.

ARTH 452 History of Photography. (3) History of photography as art from 1839 to the present.

ARTH 454 Nineteenth and Twentieth Century Sculpture. (3) Trends in sculpture from Neo-Classicism to the present. Emphasis will be put on the redefinition of sculpture during the 20th century.

ARTH 460 History of the Graphic Arts. (3) Prerequisite, ARTH 100, or ARTH 260 and 261, or consent of instructor. Graphic techniques and styles in Europe from 1400 to 1800; contributions of major artists.

ARTH 462 African Art. (3) First semester, the cultures west of the Niger River (Nigeria through Mali) from 400 B.C. to the present. The art is studied through its iconography and function in the culture and the intercultural influences upon the artists, including a study of the societies, cults and ceremonies during which the art was used.

ARTH 463 African Art. (3) Second semester, the cultures east and south of Nigeria. The art is studied through its iconography and function in the culture and the intercultural influences upon the artists, including a study of the societies, cults and ceremonies during which the art was used.

ARTH 464 African Art Research. (3) Seminar with concentration on particular aspects of African art. The course is given at the Museum of African Art in Washington, D.C.

ARTH 470 Latin American Art. (3) Art of the pre-Hispanic and the Colonial periods.

ARTH 471 Latin American Art. (3) Art of the 19th and 20th centuries.

ARTH 476 History of American Art. (3) Architecture, sculpture and painting in the United States from the Colonial period to about 1875.

ARTH 477 History of American Art. (3) Architecture, sculpture and painting in the United States from about 1875 to the present.

ARTH 489 Special Topics in Art History. (3) Prerequisite, consent of department head or

instructor. May be repeated to a maximum of six credits.

ARTH 498 Directed Studies in Art History I. (2-3) For advanced students, by permission of department chairman. Course may be repeated for credit if content differs.

ARTH 499 Directed Studies in Art History II. (2-3)

Art Studio

ARTS 100 Design. (3) Principles and elements of design through manipulation and organization of materials in two and three dimensions.

ARTS 110 Drawing I. (3) Six hours per week. An introductory course with a variety of media and related techniques. Problems based on still life, figure and nature.

ARTS 200 Intermediate Design. (3) Six hours per week. Prerequisites, ARTS 100, 110. A continuation of Design I with more individually structured problems in terms of form, composition and meaning.

ARTS 210 Drawing II. (3) Six hours per week. Prerequisites, ARTS 100, 110. Original compositions from the figure and nature, supplemented by problems of personal and expressive drawing.

ARTS 215 Anatomical Drawing. (3) Six hours per week. Prerequisites, ARTS 210 or permission of instructor. A drawing course based on the study of anatomical structure emphasizing the human body.

ARTS 220 Painting I. (3) Six hours per week. Prerequisites, ARTS 100, 110. Basic tools and language of painting. Oil and watercolor.

ARTS 277 Architectural Presentation. (3) Six hours per week. Prerequisites, ARTS 100, 110. Techniques of wash and watercolor in architectural, interior and landscape architectural rendering.

ARTS 310 Drawing III. (3) Six hours per week. Prerequisite, ARTS 210. Emphasis on understanding organic form, as it is related to study from the human figure and to pictorial composition.

ARTS 320 Painting II. (3) Six hours per week. Prerequisites, ARTS 210, 220. Original compositions based upon nature, figure and still life, supplemented by expressive painting. Choice of media.

ARTS 324 Painting III. (3) Six hours per week. Prerequisite, ARTS 320. Creative painting for advanced students. Problems require a knowledge of pictorial structure. Development of personal direction. Choice of media.

ARTS 330 Sculpture I. (3) Six hours per week. Prerequisite, ARTS 210. (For students majoring in art history, by permission of department.) Volumes, masses and planes, based on the use of plastic earths. Simple armature construction and methods of casting.

ARTS 334 Sculpture II. (3) Six hours per week. Prerequisite, ARTS 330. Nature as a point of developing ideas into organic and architectural forms.

ARTS 335 Sculpture III. (3) Six hours per week. Prerequisite, ARTS 334. Problems involving plastic earths and other material capable of being molded or cast. Choice of individual style encouraged.

ARTS 340 Printmaking I. (3) Six hours per week. Prerequisite, ARTS 210. (For students majoring in art history, by permission of department. Basic printmaking techniques in relief, intaglio, and planographic media.

ARTS 344 Printmaking II. (3) Six hours per week. Prerequisite, ARTS 210. One print media including extensive study of color processes. Individually structured problems.

ARTS 404 Experiments in Visual Processes. (3) Six hours per week. Prerequisites, either ARTS 220, 330 or 340. Investigation and execution of process oriented art. Group and individual experimental projects.

ARTS 410 Drawing IV. (3) Six hours per week. Prerequisite, ARTS 310. Advanced drawing, with emphasis on human figure, its structure and organic likeness to forms in nature. Compositional problems deriving from this relationship are also stressed.

ARTS 420 Painting IV. (3) Six hours per week. Prerequisite, ARTS 324. Creative painting. Emphasis on personal direction and self-criticism. Group seminars.

ARTS 430 Sculpture IV. (3) Six hours per week. Prerequisite, ARTS 335. Problems and techniques of newer concepts, utilizing various materials, such as plastics and metals. Technical aspects of welding stressed.

ARTS 440 Printmaking III. (3) Six hours per week. Prerequisite, ARTS 340 and 344. Contemporary experimental techniques of one print medium with group discussions.

ARTS 441 Printmaking IV. (3) Six hours per week. Prerequisite, ARTS 440. Continuation of ARTS 440.

ARTS 489 Special Problems in Studio Arts. (3) Prerequisite, consent of instructor. Repeatable to a maximum of six hours.

ARTS 498 Directed Studies in Studio Art. (2-3) For advanced students, by permission of department chairman. Course may be repeated for credit if content differs.

Astronomy

ASTR 100 Introduction to Astronomy. (3) Every semester. An elementary course in descriptive astronomy, especially appropriate for non-science students. Sun, moon, planets, stars and nebulae, galaxies, evolution. The course is illustrated with slides and demonstrations of instruments.

ASTR 105 Introduction to Modern Astronomy. (3) Three lectures per week. Prerequisite, ASTR 100. An elementary course in modern astronomy elaborating on some of the topics which could only be mentioned briefly in ASTR 100. Appropriate for non-science students.

ASTR 110 Astronomy Laboratory. (1) Two hours of laboratory work per week. Prerequisite, previous or concurrent enrollment in ASTR 100. Exercises include use of photographs of moon, stars, nebulae and galaxies and spectra; experiments demonstrating scientific concepts used in astronomy. Daytime and nighttime observations if weather permits. Appropriate for non-science majors.

ASTR 181 Introductory Astronomy and Astrophysics I. (3) Corequisite, MATH 140. Three lectures per week. For science and mathematics majors. Survey of several branches of astronomy such as the solar system, properties of stars and stellar systems, and the galaxy. ASTR 181 should not normally be taken by students who have already taken ASTR 100 and 105.

ASTR 182 Introductory Astronomy and Astrophysics II. (3) Prerequisite, ASTR 181 or consent of the instructor. Three lectures per week. For science and mathematics majors. Aspects of astronomy not included in ASTR 181 and in general more oriented toward astrophysics. The sun, stellar evolution, extragalactic objects and cosmology. Credit will be given for only one course ASTR 182 or 350.

ASTR 210 Practical Astronomy (2-3) Prerequisites, ASTR 181 or 350 and MATH 140. ASTR 100 and 105 may be substituted for ASTR 181 if approved by instructor. One lecture and one two-hour laboratory per week. 2-3 credits, according to work done. Designed primarily for astronomy majors to give the student familiarity with techniques used by astronomers and an understanding of how astronomical data are obtained. Students registered for 2 credits will not be required to do all the exercises. Coordinate systems, optics, photometry, binary stars, distance determination, Hertzsprung-Russel diagram, solar observations, moon, galactic structure, and galaxies.

ASTR 288 Special Projects in Astronomy. (1-3) Prerequisite, permission of the instructor. Independent study, short research projects, tutorial reading, and assisting with faculty research and teaching under special supervision. Repeatable to a maximum of six credits.

ASTR 330 Solar-System Astronomy. (3) No prerequisites; designed primarily for students not majoring in astronomy and suitable for non-science majors. The structure of planets and of their atmospheres, the nature of comets, asteroids and satellites. Comparison of various theories for the origin of the solar system. Emphasis on a description of recent data and interpretations.

ASTR 340 Galaxies and the Universe. (3) No prerequisite; designed primarily for students not majoring in astronomy and suitable for non-science majors. A study of galaxies including our own, radio galaxies and quasars, the measurement of distances, the recession of galaxies, the microwave background and its relation to cosmology.

ASTR 350 Astronomy and Astrophysics. (3) Prerequisites, PHYS 192, 262, or 142, or the consent of the instructor. (Recommended corequisite, PHYS 293 or 263.) Three lectures per week. Lecture survey course in astronomy and astrophysics, with strong emphasis on physical concepts. The student will use physics in astronomical and astrophysical contexts but is not expected to have had any previous introduction to astronomy. Credit will be given for only one course ASTR 182 or 350.

ASTR 398 Special Topics in Astronomy. (3) Prerequisite, junior standing or consent of instructor. This course is designed primarily for students not majoring in astronomy and is suitable for non-science students. It will concentrate study in some limited field in astronomy which will vary from semester to semester. Possible subjects for study are the solar system, extragalactic astronomy and cosmology, the inconstant universe. Repeatable to a maximum of six credits.

ASTR 399 Honors Seminar. (1-16) Credit according to work done. Enrollment is limited to students admitted to the honors program in astronomy.

ASTR 400 Introduction to Astrophysics. (3) Three lectures per week. Pre- or corequisite, PHYS 422 or consent of instructor. Spectroscopy, structure of the atmospheres of the sun and other stars. Observational data and curves of growth, chemical composition.

ASTR 401 Introduction to Astrophysics II. (3) Three lectures per week. Prerequisite, ASTR 400. A brief survey of stellar structure and evolution, and of the physics of low-density gases such as the interstellar medium and the solar atmosphere. Emphasis is placed on a good understanding of a few theoretical concepts that have wide astrophysical applications.

ASTR 410 Observational Astronomy. (3) Prerequisites, working knowledge of calculus, physics through PHYS 284, or 263, and 3 credits of astronomy. An introduction to current methods of obtaining astronomical information including radio, infrared, optical, ultra-violet, and x-ray astronomy. The laboratory work will involve photographic and photoelectric observations with the department's optical telescope and 21-cm line spectroscopy, flux measurements and interferometry with the department's radiotelescopes.

ASTR 411 Observational Astronomy. (3) Prerequisites, ASTR 410, working knowledge of calculus, physics through PHYS 284, or 263, and 3 credits of astronomy. An introduction to current methods of obtaining astronomical information including radio, infrared, optical, ultra-violet, and x-ray astronomy. The laboratory work will involve photographic and photoelectric observations with the department's optical telescope and 21-cm line spectroscopy, flux measurements and interferometry with the department's radiotelescopes. Observatory work on individual projects. Every semester.

ASTR 420 Introduction to Galactic Research. (3) Three lectures per week. Prerequisite, MATH 141 and at least 12 credits of introductory physics and astronomy courses. Stellar motions, methods of galactic research, study of our own and nearby galaxies, clusters of stars.

ASTR 430 The Solar System. (3) Prerequisite, MATH 246 and either PHYS 263 or PHYS 294, or consent of instructor. The structure of planetary atmospheres, radiative transfer in planetary atmospheres, remote sensing of planetary surfaces, interior structure of planets. Structure of comets. Brief discussions of asteroids, satellite systems, and solar system evolution.

ASTR 440 Introduction to Extra-Galactic Astronomy. (3) Prerequisite, MATH 141 and at least 14 credits of introductory physics and astronomy including a background in astronomy at the ASTR 181-182 level, or consent of instructor. Properties of normal and peculiar galaxies, including radio galaxies and quasars; expansion of the universe and cosmology.

ASTR 450 Celestial Mechanics. (3) Three lectures a week. Prerequisite, PHYS 410 or consent of instructor. Celestial mechanics, orbit theory, equations of motion.

ASTR 498 Special Problems in Astronomy. (1-6) Prerequisite, major in physics or astronomy and/or consent of advisor. Research or special study. Credit according to work done.

Business and Management

BMGT 001 Workshop. This course does not carry credit towards any degree at the University.

BMGT 110 Business Enterprise. (3) A survey course covering the internal and functional organization of a business enterprise, its organization and control.

BMGT 220 Principles of Accounting. (3) Prerequisite, sophomore standing. The principles of accounting for business enterprise and the use of accounting data in making business decisions.

A — Limited to non-accounting majors. See description above for BMGT 220.

BMGT 221 Principles of Accounting. (3) Prerequisite, BMGT 220 or 220A. The principles of accounting for business enterprise and the use of accounting data in making business decisions.

A — Limited to non-accounting majors. See description above for BMGT 221.

BMGT 230 Business Statistics I. (3) Prerequisite, MATH 220 or consent of instructor. An introductory course in statistical concepts including probability from a naive set theory approach, random variables and their properties, and the probability distributions of selected discrete and continuous random variables. The concepts of sampling, sampling distributions, and the application of these concepts to estimation hypothesis testing are included as are brief surveys of the regression and anova models. This course may not be taken for credit by management science, statistics and IFSM majors.

BMGT 231 Business Statistics I. (3) Prerequisite, MATH 141 or consent of instructor. For management science, statistics and IFSM majors. An introductory course in statistical concepts including probability from a naive set theory approach, random variables and their properties, and the probability distributions of selected discrete and continuous random variables. The concepts of sampling, sampling distributions, and the application of these concepts to estimation hypothesis testing are included as are brief surveys of the regression and anova models.

BMGT 301 Electronic Data Processing. (3) Students enrolled in the College of Business and Management curricula will register for IFSM 401. For detailed information on prerequisites and description of the course, refer to IFSM 401. The credits earned in IFSM 401 may be included in the total credits earned in the area of concentration in business and management.

BMGT 302 Electronic Data and Processing Applications. (3) Students enrolled in the College of Business and Management curricula will register for IFSM 402. For detailed information on prerequisites and description of the course, refer to IFSM 402. The credits earned in IFSM 402 may be included in the total credits earned in the area of concentration in business and management.

BMGT 310 Intermediate Accounting. (3) Prerequisite, BMGT 221 or 221A. A comprehensive study of the theory and problems of valuation of assets, application of funds, corporation accounts and statements, and the interpretation of accounting statements.

BMGT 311 Intermediate Accounting. (3) Prerequisite, BMGT 221 or 221A. A comprehensive study of the theory and problems of valuation of assets, application of funds, corporation accounts and statements, and the interpretation of accounting statements.

BMGT 320 Accounting Systems. (3) Prerequisite, BMGT 220. A study of the factors involved in the design and installation of accounting systems: the organization, volume and types of transactions, charts of accounts, accounting manuals, the reporting system.

BMGT 321 Cost Accounting. (3) Prerequisite, BMGT 221 or 221A. A study of the basic concepts of product costing and cost analysis for management planning and control. Emphasis is placed on the role of the accountant in organizational management, analysis of cost behavior, standard cost, budgeting, responsibility accounting and relevant costs for decision making.

BMGT 323 Income Tax Accounting. (3) Prerequisite, BMGT 221 or 221A. A study of the important provisions of the federal tax laws, using illustrative examples, selected questions and problems, and the preparation of returns.

BMGT 332 Operations Research for Management Decisions. (3) Prerequisite, MATH 220, BMGT 230. Surveys the philosophy, techniques, and applications of operations research to managerial decision making. The course is designed primarily for students not majoring in management science, statistics, or IFSM. Techniques covered include linear programming, transportation and assignment models, Markov processes, inventory and queueing models. Emphasis is placed on formulating and solving decision problems in the functional areas of management.

BMGT 340 Business Finance. (3) Prerequisite, BMGT 221. This course deals with principles and practices involved in the organization, financing, and rehabilitation of business enterprises; the various types of securities and their use in raising funds, apportioning income, risk, and control; intercorporate relations; and new developments. Emphasis is on solution of problems of financial policy faced by management.

BMGT 343 Investments. (3) Prerequisite, BMGT 340. An introduction to financial investments. Topics include securities and securities markets; investment risks, returns, and constraints; portfolio policies; and institutional investment policies.

BMGT 350 Marketing Principles and Organization. (3) Prerequisite, ECON 203 or 205. This is an introductory course in the field of marketing. Its purpose is to give a general understanding and appreciation of the forces operating institutions employed, and methods followed in marketing agricultural products, natural products, services and manufactured goods.

BMGT 351 Marketing Management. (3) Prerequisites, BMGT 230 and 350. A study of the work of the marketing division in a going organization. The work of developing organizations and procedures for the control of marketing activities is surveyed. The emphasis throughout the course is placed on the determination of policies, methods, and practices for the effective marketing of various forms of manufactured products.

BMGT 352 Advertising. (3) Prerequisite, BMGT 350. A study of the role of advertising in the American economy; the impact of advertising on our economic and social life, the methods and techniques currently applied by advertising practitioners; the role of the newspaper, magazine, and other media in the development of an advertising campaign,

modern research methods to improve the effectiveness of advertising and the organization of the advertising business.

BMGT 353 Retail Management. (3) Prerequisite, BMGT 220 and 350. Retail store organization, location, layout and store policy; pricing policies, price lines, brands, credit policies, records as a guide to buying; purchasing methods; supervision of selling; training and supervision of retail sales force; and administrative problems.

BMGT 360 Personnel Management. (3) The basic course in personnel management includes manpower planning, recruitment, selection, development, compensation, and appraisal of employees. Explores the impact of scientific management and unionism on these functions.

BMGT 362 Labor Relations. (3) A study of the development and methods of organized groups in industry with reference to the settlement of labor disputes. An economic and legal analysis of labor union and employer association activities, arbitration, mediation, and conciliation; collective bargaining, trade agreements, strikes, boycotts, lockouts, company unions, employee representation, and injunctions.

BMGT 364 Management and Organization Theory. (3) The development of management and organization theory, nature of the management process and function and its future development. The role of the manager as an organizer and director, the communication process, goals and responsibilities.

BMGT 370 Principles of Transportation. (3) Prerequisite, ECON 203 or 205. A general course covering the five fields of transportation, their development, service, and regulation.

BMGT 372 Traffic and Physical Distribution Management. (3) Prerequisite, junior standing. Examines the management aspects of the business firm in moving their raw materials and finished goods, through traffic, warehousing, industrial packaging, materials handling, and inventory. A systematic examination of the trade-off possibilities and management alternatives to minimize cost of product flow and maximizing customer service is provided. Not open to students who have credit for BMGT 371.

BMGT 380 Business Law. (3) Legal aspects of business relationships, contracts, negotiable instruments, agency, partnerships, corporations, real and personal property, and sales.

BMGT 381 Business Law. (3) Legal aspects of business relationships, contracts, negotiable instruments, agency, partnerships, corporations, real and personal property, and sales.

BMGT 385 Production Management. (3) Studies the operation of a manufacturing enterprise, concentrating on the economies of production. Introduces a grounding in analytical method early so that the broad problem areas of system design, operation and control can be based upon the analytical method.

BMGT 390 Risk Management. (3) Prerequisite, MATH 111. Designed to acquaint the student with the nature and significance of risk in business enterprise. The problems relating to both pure and speculative risk in business are considered; and methods of solution involving risk assumption, transfer, reduction, and the use of insurance are analyzed as aids in management decision making.

BMGT 391 Principles of Risk and Insurance. (3) Prerequisite, MATH 111. Emphasizes the use of insurance in resolving problems involving personal and business risks. Life, accident and health, fire and casualty, automobile, and marine insurance are examined as means of dealing with these risks. The theory and legal aspects of insurance are considered, as well as the quantitative measurement of risks.

BMGT 392 Introduction to International Business Management. (3) Prerequisite, ECON 203 or 205. A study of the domestic and foreign environmental factors affecting the international operations of U.S. business firms. The course also covers the administrative aspects of international marketing, finance and management.

BMGT 393 Real Estate Principles. (3) Prerequisite, ECON 203 or 205. This course covers the nature and uses of real estate, real estate as a business, basic principles, construction problems and home ownership, city planning, and public control and ownership of real estate.

BMGT 401 Introduction to Systems Management. (3) Students enrolled in the College of Business and Management curricula will register for IFSM 436. For detailed information on prerequisites and descriptions of the course, refer to IFSM 436. The credits earned in IFSM 436 may be included in the total credits earned in the area of concentration in business and management.

BMGT 420 Undergraduate Accounting Seminar. (3) Prerequisite, senior standing as an accounting major or consent of instructor. Enrollment limited to upper one-third of senior class. Seminar coverage of outstanding current non-text literature, current problems and case studies in accounting.

BMGT 421 Undergraduate Accounting Seminar. (3) Prerequisite, senior standing as an accounting major or consent of instructor. Enrollment limited to upper one-third of senior class. Seminar coverage of outstanding current non-text literature, current problems and case studies in accounting.

BMGT 422 Auditing Theory and Practice. (3) Prerequisite, BMGT 311. A study of the principles and problems of auditing and application of accounting principles to the preparation of audit working papers and reports.

BMGT 423 Apprenticeship in Accounting. (0) Prerequisites, minimum of 20 semester hours in accounting and the consent of the accounting staff. A period of apprenticeship is provided with nationally known firms of certified public accountants from about January 15 to February 15.

BMGT 424 Advanced Accounting. (3) Prerequisite, BMGT 311. Advanced accounting theory to specialized problems in partnerships, ventures, consignments, installment sales, insurance, statement of affairs, receiver's accounts, realization and liquidation reports, and consolidation of parent and subsidiary accounts.

BMGT 425 CPA Problems. (3) Prerequisite, BMGT 311, or consent of instructor. A study of the nature, form and content of C.P.A. examinations by means of the preparation of solutions to, and an analysis of, a large sample of C.P.A. problems covering the various accounting fields.

BMGT 426 Advanced Cost Accounting. (2) Prerequisite, BMGT 321. A continuation of basic cost accounting with special emphasis on process costs, standard costs, joint costs, and by-product cost.

BMGT 427 Advanced Auditing Theory and Practice. (3) Prerequisite, BMGT 422. Advanced auditing theory and practice and report writing.

BMGT 430 Linear Statistical Models in Business. (3) Prerequisite, BMGT 230 or consent of instructor. Model building involving an intensive study of the general linear stochastic model and the applications of this model to business problems. The model is derived in matrix form and this form is used to analyze both the regression and anova formulations of the general linear model.

BMGT 431 Design of Statistical Experiments in Business. (3) Prerequisite, BMGT 230 or 231. Surveys anova models, basic and advanced experimental design concepts. Non-parametric tests and correlation are emphasized. Applications of these techniques to business problems in primarily the marketing and behavioral sciences are stressed.

BMGT 432 Sample Survey Design for Business and Economics. (3) Prerequisite, BMGT 230 or 231. Design of probability samples. Simple random sampling, stratified random sampling, systematic sampling, and cluster sampling designs are developed and compared for efficiency under varying assumptions about the population sampled. Advanced designs such as multistage cluster sampling and replicated sampling are surveyed. Implementing these techniques in estimating parameters of business models is stressed.

BMGT 433 Statistical Decision Theory in Business. (3) Prerequisite, BMGT 231 or consent of instructor. Bayesian approach to the use of sample information in decision-making. Concepts of loss, risk, decision criteria, expected returns, and expected utility are examined. Application of these concepts to decision-making in the firm in various contexts are considered.

BMGT 434 Operations Research I. (3) Prerequisite, BMGT 230, MATH 240 or permission of instructor. Designed primarily for students majoring in management science, statistics, and information systems management. It is the first semester of a two semester introduction to the philosophy, techniques and applications of operations research. Topics covered include linear programming, postoptimality analysis, network algorithms, dynamic programming, inventory and equipment replacement models.

BMGT 435 Operations Research II. (3) Prerequisite, BMGT 434, or permission of instructor. The second semester of a two-part introduction to operations research. The primary emphasis is on stochastic models in management science. Topics include stochastic linear programming, probabilistic dynamic programming, Markov processes, probabilistic inventory models, queueing theory and simulation.

BMGT 436 Applications of Mathematical Programming in Management Science. (3) Prerequisite, BMGT 434 or permission of instructor. Theory and applications of linear, integer, and nonlinear programming models to management decisions. Topics covered

include the basic theorems of linear programming; the matrix formulation of the simplex, and dual simplex algorithms; decomposition, cutting plane, branch and bound, and implicit enumeration algorithms; gradient based algorithms; and quadratic programming. Special emphasis is placed upon model formulation and solution using prepared computer algorithms.

BMGT 438 Topics in Statistical Analysis for Business Management. (3) Prerequisite, BMGT 430 and MATH 240 or permission of the instructor. Selected topics in statistical analysis which are relevant to management for students with knowledge of basic statistical methods. Topics include evolutionary operation and response surface analysis, forecasting techniques, pathologies of the linear model and their remedies, multivariate statistical models, and non-parametric models.

BMGT 440 Financial Management. (3) Prerequisite, BMGT 340. Analysis and discussion of cases and readings relating to financial decisions of the firm. The application of finance concepts to the solution of financial problems is emphasized.

BMGT 443 Security Analysis and Valuation. (3) Prerequisite, BMGT 343. Study and application of the concepts, methods, models, and empirical findings to the analysis, valuation, and selection of securities, especially common stock.

BMGT 445 Commercial Bank Management. (3) Prerequisites, BMGT 340 and ECON 430. Analysis and discussion of cases and readings in commercial bank management. The loan function is emphasized; also the management of liquidity reserves, investments for income, and source of funds. Bank objectives, functions, policies, organization, structure, services, and regulation are considered.

BMGT 450 Marketing Research Methods. (3) Prerequisites, BMGT 230 and 350. Recommended that BMGT 430 be taken prior to this course. This course is intended to develop skill in the use of scientific methods in the acquisition, analysis and interpretation of marketing data. It covers the specialized fields of marketing research; the planning of survey projects, sample design, tabulation procedure and report preparation.

BMGT 451 Consumer Analysis. (3) Prerequisites, BMGT 350 and 351. Recommended that PSYC 100 and 221 be taken prior to this course. Considers the growing importance of the American consumer in the marketing system and the need to understand him. Topics include the foundation considerations underlying consumer behavior such as economic, social, psychological and cultural factors. Analysis of the consumer in marketing situations — as a buyer and user of products and services — and in relation to the various individual social and marketing factors affecting his behavior. The influence of marketing communications is also considered.

BMGT 452 Promotion Management. (3) Prerequisites, BMGT 350 and 352. This course is concerned with the way in which business firms use advertising, personal selling, sales promotion, and other methods as part of their marketing program. The case study method is used to present problems taken from actual business practice. Cases studied illustrate problems in the use and coordination of demand stimulation methods as well as analysis and planning. Research, testing and statistical control of promotional activities are also considered.

BMGT 453 Industrial Marketing. (3) Prerequisite, BMGT 350 plus one other marketing course. The industrial and business sector of the marketing system is considered rather than the household or ultimate consumer sector. Industrial products range from raw materials and supplies to the major equipment in a plant, business office, or institution. Topics include product planning and introduction, market analysis and forecasting, channels, pricing, field sales force management, advertising, marketing cost analysis, and government relations. Particular attention is given to industrial, business and institutional buying policies and practice and to the analysis of buyer behavior.

BMGT 454 International Marketing. (3) Prerequisites, BMGT 350 plus any other marketing course. A study of the marketing functions from the viewpoint of the international executive. In addition to the coverage of international marketing policies relating to product adaptation, data collection and analysis, channels of distribution, pricing, communications, and cost analysis, consideration is given to the cultural, legal, financial, and organizational aspects of international marketing.

BMGT 455 Sales Management. (3) The role of the sales manager, both at headquarters and in the field, in the management of people, resources and marketing functions. An analysis of the problems involved in sales organization, forecasting, planning, communicating, evaluating and controlling. Attention is given to the application of quantitative techniques and pertinent behavioral science concepts in the management of the sales effort and sales force.

BMGT 460 Personnel Management — Analysis and Problems. (3) Prerequisite, BMGT 360. Recommended, BMGT 230. Research findings, special readings, case analysis, simulation, and field investigations are used to develop a better understanding of personnel problems, alternative solutions and their practical ramifications.

BMGT 462 Labor Legislation. (3) Case method analysis of the modern law of industrial relations. Cases include the decisions of administrative agencies, courts and arbitration tribunals.

BMGT 463 Public Sector Labor Relations. (3) Prerequisite, BMGT 362 or permission of instructor. Development and structure of labor relations in public sector employment; federal, state, and local government responses to unionization and collective bargaining.

BMGT 464 Organizational Behavior. (3) Prerequisite, BMGT 364. An examination of research and theory concerning the forces which contribute to the behavior of organizational members. Topics covered include: work group behavior, supervisory behavior, intergroup relations, employee goals and attitudes, communication problems, organizational change, and organizational goals and design.

BMGT 467 Undergraduate Seminar in Personnel Management. (3) Prerequisite, consent of instructor. This course is open only to the top one-third of undergraduate majors in personnel and labor relations and is offered during the fall semester of each year. Highlights major developments. Guest lecturers make periodic presentations.

BMGT 470 Land Transportation Systems. (3) Prerequisite, BMGT 370. Overall view of managerial problems facing land carriers, emphasis on rail and motor modes of transportation.

BMGT 471 Air and Water Transportation Systems. (3) Prerequisite, BMGT 370. Overall view of managerial problems facing air and water carriers; emphasis on international and domestic aspects of air and water modes of transportation. Not open for credit to students who have credit for BMGT 472.

BMGT 473 Advanced Transportation Problems. (3) Prerequisite, BMGT 370. A critical examination of current government transportation policy and proposed solutions. Urban and intercity managerial transport problems are also considered.

BMGT 474 Urban Transport and Urban Development. (3) Prerequisite, ECON 203 or 205. An analysis of the role of urban transportation in present and future urban development. The interaction of transport pricing and service, urban planning, institutional restraints, and public land uses is studied.

BMGT 475 Advanced Logistics Management. (3) Prerequisites, BMGT 370, 372, 332. Application of the concepts of BMGT 372 to problem solving and special projects in logistics management; case analysis is stressed.

BMGT 480 Legal Environment of Business. (3) The course examines the principal ideas in law stressing those which are relevant for the modern business executive. Legal reasoning as it has evolved in this country will be one of the central topics of study. Several leading antitrust cases will be studied to illustrate vividly the reasoning process as well as the interplay of business, philosophy, and the various conceptions of the nature of law which give direction to the process. Examination of contemporary legal problems and proposed solutions, especially those most likely to affect the business community, are also covered.

BMGT 481 Public Utilities. (3) Prerequisite, ECON 203 or 205. Using the regulated industries as specific examples, attention is focused on broad and general problems in such diverse fields as constitutional law, administrative law, public administration, government control of business, advanced economic theory, accounting, valuation and depreciation, taxation, finance, engineering, and management.

BMGT 482 Business and Government. (3) Prerequisite, ECON 203 or 205. A study of the role of government in modern economic life. Social control of business as a remedy for the abuses of business enterprise arising from the decline of competition. Criteria of limitations on government regulation of private enterprise.

BMGT 485 Advanced Production Management. (3) Prerequisite, BMGT 385. A study of typical problems encountered by the factory manager. The objective is to develop the ability to analyze and solve problems in management control of production and in the formulation of production policies. Among the topics covered are plant location, production planning and control, methods analysis, and time study.

BMGT 490 Urban Land Management (3) Covers the managerial and decision making

aspects of urban land and property. Included are such subjects as land use and valuation matters.

BMGT 493 Honors Study. (3) First semester of the senior year. Prerequisite, candidacy for honors in business and management. The course is designed for honors students who have elected to conduct intensive study (independent or group). The student will work under the direct guidance of a faculty advisor and the chairman of the honors committee. They shall determine that the area of study is of a scope and intensity deserving of a candidate's attention. Formal written and/or oral reports on the study may be required by the faculty advisor and/or chairman of the honors program. Group meetings of the candidates may be called at the discretion of the faculty advisors and/or chairman of the honors committee.

BMGT 494 Honors Study. (3) Second semester of the senior year. Prerequisite, BMGT 493, and continued candidacy for honors in business and management. The student shall continue and complete the research initiated in BMGT 493, additional reports may be required at the discretion of the faculty advisor and honors program chairman. Group meetings may be held.

BMGT 495 Business Policies. (3) Prerequisites, BMGT 340, 350, 364, and senior standing. A case study course in which the aim is to have the students apply what they have learned of general management principles and their specialized functional applications to the overall management function in the enterprise.

BMGT 496 Business and Society. (3) Prerequisite, one course in BMGT or consent of instructor. Normative role of business in society; consideration of the sometimes conflicting interests and claims on the firm and its objectives.

Botany

BOTN 100 General Botany for Non-Science Students. (4) Two lectures and two laboratory periods a week. A basic course in plant biology specifically designed to meet the educational needs of the general or non-science student. Emphasis is placed on an ecological approach to studying fundamental concepts and processes of plants, and stressing the importance of plant life to human welfare. Credit not allowed for both BOTN 100 and 101.

BOTN 101 General Botany. (4) Two lectures and two laboratory periods a week. A basic course in plant biology specifically designed to meet the educational needs of students majoring in the physical or biological sciences. This course prepares students for advanced courses in plant science. Emphasis is placed on fundamental biological principles and mechanisms governing higher plant life in the ecosystem. (Credit not allowed for both BOTN 100 and 101.)

BOTN 202 Plant Kingdom. (4) Two lectures and two laboratory periods a week. Prerequisite, BOTN 100 or equivalent. A brief evolutionary study of algae, fungi, liverworts, mosses, ferns and their relatives, and the seed plants, emphasizing their structure, reproduction, habitats, and economic importance.

BOTN 211 Principles of Conservation. (3) Three lectures per week. A study of the principles of economical use of our natural resources including water, soil, plants, minerals, wildlife and man.

BOTN 212 Plant Taxonomy. (3) One lecture and two laboratory periods a week. Prerequisite, BOTN 100 or equivalent. An introductory study of plant classification, based on the collection and identification of local plants.

BOTN 221 Diseases of Plants. (4) Two lectures and two laboratory periods a week. Prerequisite, BOTN 100 or equivalent. An introductory study of the symptoms and causal agents of plant diseases and measures for their control.

BOTN 389 Tutorial Readings in Botany (Honors Course). (2-3) Prerequisite, admission to the department of botany honors program. A review of the literature dealing with a specific research problem in preparation for original research to be accomplished in BOTN 399. Papers will be assigned and discussed in frequent sessions with the instructor.

BOTN 398 Seminar. (1) Repeatable to a maximum of two semester hours credit. Prerequisite, permission of instructor. Discussion and readings on special topics, current literature, or problems and progress in all phases of botany. Minor experimental work may be pursued if facilities and the qualifications of the students permit. For seniors only, majors and minors in botany or biological science.

BOTN 399 Research Problems in Botany. (1-3) Prerequisites, twenty hours of botany courses and permission of the instructor. Research and/or integrated reading in botany under the direction and close supervision of a member of the faculty. May be repeated for a maximum of 6 credits.

BOTN 401 History and Philosophy of Botany. (1) Prerequisites, 20 semester credit hours in biological sciences including BOTN 100 or equivalent. Discussion of the development of ideas and knowledge about plants, leading to a survey of contemporary work in botanical science.

BOTN 402 Plant Microtechnique. (3)

BOTN 403 Medicinal and Poisonous Plants. (2) Prerequisite, BOTN 100 or 101 and CHEM 104. Two lectures per week. A study of plants important to man that have medicinal or poisonous properties. Emphasis on plant source, plant description, the active agent and its beneficial or detrimental physiological action and effects.

BOTN 405 Systematic Botany. (3) Two two-hour laboratory periods a week. Prerequisite, BOTN 212 or equivalent. An advanced study of the principles of systematic botany. Laboratory practice with difficult plant families including grasses, sedges, legumes, and composites. Field trips arranged.

BOTN 407 Teaching Methods in Botany. (2) Four two-hour laboratory demonstration periods per week, for eight weeks. Prerequisite, BOTN 100 or equivalent. A study of the biological principles of common plants, and demonstrations, projects, and visual aids suitable for teaching in primary and secondary schools.

BOTN 411 Plant Anatomy. (3) Summer or University College. Lectures and labs to be arranged. The origin and development of the organs and the tissue systems in the vascular plants.

BOTN 413 Plant Geography. (2) Prerequisite, BOTN 100 or equivalent. A study of plant distribution throughout the world and the factors generally associated with such distribution.

BOTN 414 Plant Genetics. (3) Prerequisite, BOTN 100 or equivalent. The basic principles of plant genetics are presented; the mechanics of transmission of the heredity factors in relation to the life cycle of seed plants, the genetics of specialized organs and tissues, spontaneous and induced mutations of basic and economic significance, gene action, genetic maps, the fundamentals of polyploidy, and genetics in relation to methods of plant breeding are the topics considered.

BOTN 415 Plants and Mankind. (2) Prerequisite, BOTN 100 or equivalent. A survey of the plants which are utilized by man, the diversity of such utilization, and their historic and economic significance.

BOTN 416 Principles of Plant Anatomy. (4) Two lectures and two 2-hour laboratory periods a week. The origin and development of cells, tissues, and tissue systems of vascular plants with special emphasis on seed-bearing plants. Particular stress is given to the comparative, systematic, and evolutionary study of the structural components of the plants. Prerequisite, general botany.

BOTN 417 Field Botany and Taxonomy. (2) Prerequisite, BOTN 100 or general biology. Four two-hour laboratory periods a week for eight weeks. The identification of trees, shrubs, and herbs, emphasizing the native plants of Maryland. Manuals, keys, and other techniques will be used. Numerous short field trips will be taken. Each student will make an individual collection.

BOTN 419 Natural History of Tropical Plants. (2) Prerequisite, one course in plant taxonomy or permission of instructor. An introduction to tropical vascular plants with emphasis on their morphological, anatomical, and habital peculiarities and major taxonomic features, geographic distribution and economic utilization of selected families. Two one-hour lectures per week.

BOTN 422 Research Methods in Plant Pathology. (2) Two laboratory periods a week. Prerequisite, BOTN 221 or equivalent. Advanced training in the basic research techniques and methods of plant pathology.

BOTN 424 Diagnosis and Control of Plant Diseases. (3) Prerequisite, BOTN 221. Three lectures per week. A study of various plant diseases grouped according to the manner in which the host plants are affected. Emphasis will be placed on recognition of symptoms of the various types of diseases and on methods of transmission and control of the pathogens involved.

BOTN 425 Diseases of Ornamentals and Turf. (2) Prerequisite, BOTN 221. Two lectures per week. Designed for those students who need practical experience in recognition and control of ornamentals and turf diseases. The symptoms and current control measures for diseases in these crop areas will be discussed.

BOTN 426 Mycology. (4) Two lectures and two two-hour laboratory periods a week. An introductory study of morphology, classification, life histories, and economics of the fungi.

BOTN 427 Field Plant Pathology. (1) Summer session: lecture and laboratory to be arranged. Prerequisite, BOTN 221 or equivalent. The techniques of pesticide evaluation and the identification and control of diseases of Maryland crops are discussed. Offered in alternate years or more frequently with demand.

BOTN 441 Plant Physiology. (4) Two lectures and one four-hour laboratory period a week. Prerequisites, BOTN 100 and general chemistry. Organic chemistry strongly recommended. A survey of the general physiological activities of plants.

BOTN 462 Plant Ecology. (2) Prerequisite, BOTN 100. Two lectures per week. The dynamics of populations as affected by environmental factors with special emphasis on the structure and composition of natural plant communities, both terrestrial and aquatic.

BOTN 463 Ecology of Marsh and Dune Vegetation. (2) Two lectures a week. Prerequisites, BOTN 100. An examination of the biology of higher plants in dune and marsh ecosystems.

BOTN 464 Plant Ecology Laboratory. (2) Prerequisite, BOTN 462 or its equivalent or concurrent enrollment therein. One three-hour laboratory period a week. Two or three field trips per semester. The application of field and experimental methods to the qualitative and quantitative study of vegetation and ecosystems.

BOTN 471 Marine and Estuarine Botany. (3) Prerequisite, BOTN 441 or equivalent. An ecological discussion of plant life in the marine environment of sea coasts, salt marshes, estuaries and open seas.

BOTN 475 General Phycology. (4) One lecture and two three-hour laboratory periods per week. Prerequisites, BOTN 100 and BOTN 202, or permission of instructor. An introductory study of both macro- and micro-algae, including the taxonomy, morphology, and life cycles of both fresh water and marine forms.

BOTN 477 Marine Plant Biology. (4) Prerequisite, BOTN 100 or general biology plus organic chemistry or the consent of the instructor. Five one-hour lectures and three 3-hour laboratories each week for six weeks. An introduction to the taxonomic, physiological and biochemical characteristics of marine plants which are basic to their role in the ecology of the oceans and estuaries.

BOTN 497 Special Problems in Marine Research. (1-3) Prerequisites, BOTN 100 or general biology plus organic chemistry or consent of instructor. Recommended concurrent or previous enrollment in BOTN 477, Marine Plant Biology. An experimental approach to problems in marine research dealing primarily with phytoplankton, the larger algae, and marine spermatophytes. Emphasis will be placed on their physiological and biochemical activities.

Behavioral and Social Sciences

BSOS 101 Introduction to the Behavioral-Social Sciences. (3) An introduction to modern behavioral and social sciences: brief history, underlying principles, methods and trends of the major behavioral and social science disciplines. Selected contemporary problems and their handling by several appropriate disciplines of the behavioral-social sciences.

BSOS 308 Contemporary Issues — Interdisciplinary Approaches. (3) An interdisciplinary analysis of current public policy issues of international, national and community import. Senior standing recommended. This course may be repeated once for credit, provided a different topic is offered.

Physical Therapy

BTPT 001 Orientation to Physical Therapy. (1) One hour lecture per week. Credit not applicable towards any degree. A lecture series describing the academic and clinical aspects of physical therapy. Representatives of other allied health areas will be invited to speak. S/F grading only.

Chemistry

CHEM 101 Introductory College Chemistry. (2) Two lectures and one recitation per week. An introduction to the study of matter. This course is intended to be followed by CHEM 103. This course may not be taken for credit by students with credit in CHEM 001, 003, 005, 102, 103, or 105 or their equivalents. This course may not be taken to satisfy the general education science requirement.

CHEM 102 Chemistry of Man's Environment. (4) Three lectures and one three-hour laboratory per week. Non-mathematical presentation of basic chemical principles and applications in cosmochemistry, geochemistry, biochemistry, and nuclear chemistry. Particular emphasis is placed on the development of man's environment and his effect upon it. This course is for the general student and does not satisfy the requirements of the professional schools.

CHEM 103 College Chemistry I. (4) Three lectures, one recitation, and one three-hour laboratory per week. Prerequisite, CHEM 101 or satisfactory performance on qualifying test. The first semester of a general chemistry sequence intended for students whose curricula require a year or more of chemistry to provide a working knowledge of the science, nature and composition of matter; chemical calculations; atomic structure; solutions.

CHEM 104 College Chemistry II. (4) Three lectures, one recitation, and one three-hour laboratory per week. Prerequisite, CHEM 103 or 105. A continuation of CHEM 103. The chemistry of carbon, aliphatic compounds; acids and bases, aromatic compounds; stereochemistry; halides; amines and amides; acids, esters; carbohydrates; natural products.

CHEM 105 Principles of College Chemistry I. (4) Three lectures, one recitation, and one three-hour laboratory per week. A more rigorous treatment of the material of CHEM 103. Admission by invitation of the chemistry department based on performance on a qualifying test.

CHEM 106 Principles of College Chemistry II. (4) Three lectures, one recitation, and one three-hour laboratory per week. Prerequisite, CHEM 103 or 105 and consent of the chemistry department. A more rigorous treatment of the material of CHEM 104.

CHEM 107 Chemistry and Man. (3) Lecture course intended for non-chemistry majors. The impact of chemistry on man. The chemistry of the universe around us, of life, of the body, of the mind, of food and drugs, of consumer goods, and of everyday living. Basic knowledge of chemistry helpful to the intelligent citizen of today.

CHEM 201 College Chemistry III. (3) Three lectures and one recitation per week. Prerequisite, CHEM 104 or 106. A continuation of CHEM 104. Organic chemistry, with emphasis on molecular structure; stereochemistry, conformational analysis; substitution reactions; carbonium ions; spectroscopy; aromaticity; synthetic processes. This course must be accompanied by CHEM 202 unless credit for CHEM 202 has previously been established.

CHEM 202 College Chemistry Laboratory III. (2) One lecture and one three-hour laboratory per week. Prerequisite, CHEM 104 or 106. A laboratory course to accompany CHEM 201. This course must be accompanied by CHEM 201.

CHEM 203 College Chemistry IV. (3) Three lectures and one recitation per week. Prerequisite, CHEM 104 or 106. Introductory analytical and theoretical chemistry. Bonding theory; electrochemistry; molecular energetics and structure; chemical dynamics; equilibrium; determination of composition of matter. This course must be accompanied by CHEM 204 unless credit for CHEM 204 has previously been established.

CHEM 204 College Chemistry Laboratory IV. (2) One lecture and one three-hour laboratory per week. Prerequisite, CHEM 104 or 106. A laboratory course to accompany CHEM 203. This course must be accompanied by CHEM 203.

CHEM 211 Principles of College Chemistry III. (3) Three lectures and one recitation per week. Prerequisite, CHEM 104 or 106 and consent of the chemistry department. A more rigorous treatment of the material of CHEM 201. This course must be accompanied by CHEM 212 unless credit for CHEM 212 has previously been established.

CHEM 212 Principles of College Chemistry Laboratory III. (2) One lecture and one three-hour laboratory per week. Prerequisite, CHEM 104 or 106 and consent of the chemistry department. A more rigorous treatment of the material of CHEM 202. This course must be accompanied by CHEM 211.

CHEM 213 Principles of College Chemistry IV. (3) Three lectures and one recitation per week. Prerequisite, CHEM 104 or 106 and consent of chemistry department. A more rigorous treatment of the material of CHEM 203. This course must be accompanied by CHEM 214 unless credit for CHEM 214 has previously been established.

CHEM 214 Principles of College Chemistry Laboratory IV. (2) One lecture and one three-hour laboratory per week. Prerequisite, CHEM 104 or 106 and consent of the chemistry department. A more rigorous treatment of the material of CHEM 204. This course must be accompanied by CHEM 213.

CHEM 261 Elements of Biochemistry. (3) For undergraduate students who desire a one-semester biochemistry course rather than a two-semester sequence. Course covers basic chemistry and metabolism of most molecules of biological importance. Not open to student with credit in CHEM 461. Three lectures per week. Prerequisite, CHEM 104.

CHEM 302 Radiochemical Safety Procedures. (1) One lecture per week. A lecture and demonstration course. Radiation hazards, principles and practices of radiation safety, federal (AEC, ICC) codes and state public health.

CHEM 321 Quantitative Analysis. (4) Two lectures and two three-hour laboratory periods per week. Prerequisites, CHEM 203-204 or 213-214. Volumetric, gravimetric, electrometric, and colorimetric methods. Intended for students in agricultural chemistry,

general physical science, science education, etc.

CHEM 398 Special Projects. (2) Honors projects for undergraduate students.

CHEM 399 Introduction to Chemical Research. (1-2) Prerequisite, junior standing. Registration only upon consent of the course coordinator. The course will allow students to conduct basic research under the supervision of a member of the department. May be repeated for credit to a maximum of four credits.

CHEM 401 Inorganic Chemistry. (3) Three lectures per week. Prerequisite, CHEM 481.

CHEM 403 Radiochemistry. (3) Three lectures per week. Prerequisite, one year of college chemistry and one year of college physics. Radioactive decay; introduction to properties of atomic nuclei; nuclear processes in cosmology; chemical, biomedical and environmental applications of radioactivity; nuclear processes as chemical tools; interaction of radiation with matter.

CHEM 421 Advanced Quantitative Analysis. (3) Three lectures per week. Prerequisites, CHEM 430 and 482 or concurrent registration. An examination of some advanced topics in quantitative analysis including nonaqueous titrations, precipitation phenomena, complex equilibria, and the analytical chemistry of the less familiar elements.

CHEM 423 Organic Quantitative Analysis. (2) Two three-hour laboratory periods per week. Prerequisite, CHEM 203-204 or 213-214, and consent of the instructor. The semi-micro determination of carbon, hydrogen, nitrogen, halogen and certain functional groups.

CHEM 430 Chemical Measurements Laboratory I. (3) One lecture and two three-hour laboratory periods per week. Corequisite, CHEM 481. An introduction to the principles and applications of quantitative techniques useful in chemistry, with emphasis on modern instrumentation. Computer programming, electronic circuits, spectroscopy, chemical separations.

CHEM 431 Chemical Measurements Laboratory II. (3) One lecture and two three-hour laboratory periods per week. Prerequisite, CHEM 481; corequisite, CHEM 482. An introduction to the principles and applications of quantitative techniques useful in chemistry, with emphasis on modern instrumentation. Communications techniques, vacuum systems, thermochemistry, phase equilibria, chemical kinetics, electrochemistry.

CHEM 433 Chemical Synthesis. (3) One lecture and two three-hour laboratory periods per week. Prerequisite, CHEM 201-202 or 211-212, and 203-204 or 213-214.

CHEM 441 Advanced Organic Chemistry. (3) Prerequisite, CHEM 481. An advanced study of the compounds of carbon, with special emphasis on molecular orbital theory and organic reaction mechanisms.

CHEM 443 Qualitative Organic Analysis. (3) One lecture and two three-hour laboratory periods per week. Prerequisite, CHEM 201-202 or 211-212, and 203-204 or 213-214. The systematic identification of organic compounds.

CHEM 447 Geochemistry of Fuels. (3) Prerequisite, CHEM 104 or consent of instructor. Discussion of the progenitors and the biochemical, chemical and physical agencies that convert them into crude oils, coals of various ranks, natural gas, and other organic fuels. The origin, composition, mineralogy, and organic constituents (kerogen) of oil shales. Mineralogy, geochemical cycles, and accumulation of uranium and thorium.

CHEM 461 Biochemistry I. (3) Three lectures per week. Prerequisite, CHEM 203-204 or 213-214, or permission of instructor. A comprehensive introduction to general biochemistry wherein the chemistry and metabolism of carbohydrates, lipids, nucleic acids, and proteins are discussed.

CHEM 462 Biochemistry II. (3) Three lectures per week. Prerequisite, CHEM 461. A continuation of CHEM 461.

CHEM 463 Biochemistry Laboratory I. (2) Two three-hour laboratory periods per week. Prerequisite, CHEM 461 or concurrent registration in CHEM 461.

CHEM 464 Biochemistry Laboratory II. (2) Two three-hour laboratory periods per week. Prerequisite, CHEM 462 or concurrent registration in CHEM 462, and CHEM 430 or CHEM 463.

CHEM 471 Geochemical Methods of Analysis. (3) Prerequisite, CHEM 103, 104. The course will consider the principles and application of geochemical analysis as applied to a variety of geological problems. The topics covered will include x-ray and optical spectroscopy, x-ray diffraction, atomic absorption, electron microprobe and electron microscopy.

CHEM 472 Principles of Geochemistry. (3) Three lectures per week. Prerequisite, CHEM 104 or equivalent, and senior standing. A survey of historical and modern theories of the origin of the universe and the solar system. The origin of elements and their distributions in space, on extra-terrestrial bodies and on earth. Discussion of the origin of igneous rocks, of the physical and chemical factors governing development and distribution of sedimentary rocks, of the oceans, and of the atmosphere. Organic sediments, the internal structures of earth and the planets, the role of isotopes in geothermometry and in the solution of other problems.

CHEM 473 Geochemistry of Solids. (3) Three lectures per week. Prerequisite, CHEM 482 or GEOL 422. Principles of crystal chemistry applied to structures, properties and reactions of minerals and non-metallic solids. Emphasis is placed on the relation of structural stability to bonding, ionic size, charge, order-disorder, polymorphism, and isomorphism.

CHEM 474 Environmental Chemistry. (3) Three lectures per week. Prerequisite, CHEM 481 or equivalent. The sources of various elements and chemical reactions between them in the atmosphere and hydrosphere are treated. Causes and biological effects of air and water pollution by certain elements are discussed.

CHEM 475 General Oceanography. (3) Three lectures per week. Prerequisite, CHEM 103 or equivalent, and one additional semester of physical science. An introduction to physical, chemical and geological processes that occur in the marine environment including physical and chemical properties of sea water, geology of the sea floor, general circulation of the ocean, currents, waves, and tides.

CHEM 476 Geochemistry of the Biosphere. (3) Prerequisite, two years of chemistry including one year of either organic or physical chemistry. Three lectures per week. An interdisciplinary approach involving inorganic, organic, physical, and biochemistry to integrate the available information necessary to interpret and explain the major aspects of the geochemistry of the biosphere.

CHEM 481 Physical Chemistry I. (3) Three lectures per week. Prerequisite, CHEM 203-204 or 213-214, MATH 141, PHYS 142 or PHYS 263 (PHYS 263 may be taken concurrently with CHEM 481) or consent of instructor. A course primarily for chemists and chemical engineers.

CHEM 482 Physical Chemistry II. (3) Three lectures per week. Prerequisite, CHEM 481, or consent of instructor. A course primarily for chemists and chemical engineers.

CHEM 485 Advanced Physical Chemistry. (2) Prerequisite, CHEM 482. Quantum chemistry and other selected topics.

CHEM 486 Advanced Physical Chemistry Laboratory. (2) Two three-hour laboratory periods per week. Prerequisites, CHEM 482 and consent of instructor.

CHEM 498 Special Topics in Chemistry. (3) Three lectures or two lectures and one three-hour laboratory per week. Prerequisite varies with the nature of the topic being considered. Course may be repeated for credit if the subject matter is substantially different, but not more than three credits may be accepted in satisfaction of major supporting area requirements for chemistry majors.

Chinese

CHIN 101 Intensive Elementary Chinese. (6) Introduction to reading, writing, and speaking Chinese with an emphasis on mastering the essentials of pronunciation, basic characters and structural patterns. Eight hours per week.

CHIN 102 Intensive Elementary Chinese. (6) Introduction to reading, writing, and speaking Chinese with an emphasis on mastering the essentials of pronunciation, basic characters and structural patterns. Eight hours per week.

CHIN 103 Review of Elementary Chinese. (3) Designed for students with prior experience with the Chinese language, either written or spoken, who have need of further preparation before entering Chinese 201. CHIN 103 may be taken simultaneously with Chinese 201, 104 with 202, on recommendation of the director of the Chinese program

CHIN 104 Review of Elementary Chinese. (3) Designed for students with prior experience with the Chinese language, either written or spoken, who have need of further preparation before entering Chinese 201. CHIN 103 may be taken simultaneously with Chinese 201, 104 with 202, on recommendation of the director of the Chinese program.

CHIN 201 Intermediate Chinese. (3) Three recitations per week; additional electronic laboratory in CHIN 201. Prerequisite, CHIN 102 or equivalent. Reading of texts designed to give some knowledge of Chinese life, thought and culture.

CHIN 202 Intermediate Chinese. (3) Three recitations per week. Prerequisite, CHIN 201 or equivalent. Reading of texts designed to give some knowledge of Chinese life, thought and culture.

CHIN 301 Advanced Chinese. (3) Advanced level study of language patterns and syntax as well as development of vocabulary and skills necessary to prepare the student for eventual use of original sources. Prerequisite, Chinese 201, 202, or permission of the director of the Chinese program.

CHIN 302 Advanced Chinese. (3) Advanced level study of language patterns and syntax as well as development of vocabulary and skills necessary to prepare the student for eventual use of original sources. Prerequisite, Chinese 201, 202, or permission of the director of the Chinese program.

CHIN 401 Readings in Chinese History and Literature I. (3) Prerequisite, CHIN 302 or equivalent. A language training course using original sources in history and literature.

CHIN 402 Readings in Chinese History and Literature II. (3) Prerequisite, CHIN 401 or equivalent. A language training course using original sources in history and literature.

CHIN 403 Classical Chinese I. (3) Prerequisite, CHIN 302. Introductory classical Chinese using literary and historical sources in the original language.

CHIN 404 Classical Chinese II. (3) Prerequisite, CHIN 302. Further classical studies by various writers from famous ancient philosophers to prominent scholars before the new culture movement.

CHIN 405 Advanced Conversation and Composition I. (3) Prerequisite, CHIN 202 or equivalent. Review of contemporary grammar with emphasis on contemporary materials and free composition.

CHIN 406 Advanced Conversation and Composition II. (3) Prerequisite, CHIN 405 or equivalent. Analysis of the role of language in literature; study of principles and techniques of advanced composition, speech composition, letter and report writing.

CHIN 411 Chinese Civilization. (3) This course supplements GEOG 422; cultural geography of China and Japan. It deals with Chinese literature, art, folklore, history, government, and great men. The course is given in English.

CHIN 412 Chinese Civilization. (3) Developments in China since 1911. The course is given in English.

CHIN 413 Survey of Chinese Literature in Translation I. (3) The background and development of Chinese literature from the earliest philosophical writings through the poetry of the Sung dynasty (13th century A.D.)

CHIN 414 Survey of Chinese Literature in Translation II. (3) Yuan dynasty drama through Ming and Ching novels and essays to the modern and revolutionary short stories, essays and poetry of twentieth century China.

CHIN 421 Chinese Linguistics. (3) Prerequisite, CHIN 102 or equivalent.

CHIN 422 Chinese Linguistics. (3) Prerequisite, CHIN 102 or equivalent.

CHIN 431 Translation and Interpretation I. (3) Prerequisite, CHIN 202 or equivalent. Introduction to the history and theories of translation/interpretation; contrastive studies of the structures of English and Chinese; development of the four language skills.

CHIN 432 Translation and Interpretation II. (3) Prerequisite, CHIN 431 or equivalent.

Comparative Literature

CMLT 401 Introductory Survey of Comparative Literature. (3) Survey of the background of European literature through study of Greek and Latin literature in English translations, discussing the debt of modern literature to the ancients.

CMLT 402 Introductory Survey of Comparative Literature. (3) Study of the medieval and modern continental literature.

CMLT 411 The Greek Drama. (3) The chief works of Aeschylus, Sophocles, Euripides, and Aristophanes in English translations Emphasis on the historic background, on dramatic structure, and on the effect of the Attic drama upon the mind of the civilized world.

CMLT 415 The Old Testament as Literature. (3) A study of sources, development and literary types.

CMLT 416 New Testament as Literature. (3) A study of the books of the New Testament, with attention to the relevant historical background and to the transmission of the text. A knowledge of Greek is helpful, but not essential.

CMLT 421 The Classical Tradition and its Influence in the Middle Ages and the Renaissance. (3) Emphasis on major writers. Reading knowledge of Greek or Latin required.

CMLT 422 The Classical Tradition and its Influence in the Middle Ages and the Renaissance. (3) Emphasis on major writers. Reading knowledge of Greek or Latin required.

CMLT 430 Literature of the Middle Ages. (3) Narrative, dramatic and lyric literature of the Middle Ages studied in translation.

CMLT 433 Dante and the Romance Tradition. (3) A reading of the Divine Comedy to enlighten the discovery of reality in western literature.

CMLT 461 Romanticism — Early Stages. (3) Emphasis on England, France and Germany. Reading knowledge of French or German required.

CMLT 462 Romanticism — Flowering and Influence. (3) Emphasis on England, France and Germany. Reading knowledge of French or German required.

CMLT 469 The Continental Novel. (3) The novel in translation from Stendhal through the Existentialists, selected from literatures of France, Germany, Italy, Russia, and Spain.

CMLT 470 Ibsen and the Continental Drama. (3) Emphasis on the major work of Ibsen, with some attention given to selected predecessors, contemporaries and successors.

CMLT 479 Major Contemporary Authors. (3)

CMLT 488 Genres. (3) A study of a recognized literary form, such as tragedy, epic, satire, literary criticism, comedy, tragicomedy, etc. The course may be repeated for cumulative credit up to six hours when different material is presented.

CMLT 489 Major Writers. (3) Each semester two major writers from different cultures and languages will be studied. Authors will be chosen on the basis of significant relationships of cultural and aesthetic contexts, analogies between their respective works, and the importance of each writer to his literary tradition.

CMLT 496 Conference Course in Comparative Literature. (3) Second semester. A tutorial type discussion course, correlating the courses in various literatures which the student has previously taken with the primary themes and masterpieces of world literature. This course is required of undergraduate majors in comparative literature, but must not be taken until the final year of the student's program.

CMLT 498 Selected Topics in Comparative Literature. (3)

Computer Science

CMSC 100 Introduction to Use of the Digital Computer. (1) An introduction to the use of Fortran for solution of simple computational tasks. The use of a conversational mode to simplify the computational process will be emphasized. Where possible students will be assigned to sections of comparable background. Examples and problems for the sections will be chosen appropriate to the background of the students.

CMSC 103 Introduction to Computing for Non-Majors. (3) Two lectures and one two-hour laboratory period each week. Basic concepts of Fortran. Elements of computer organization. Algorithms in the computational solution of problems. Survey of non-numeric and numeric applications. Programming projects.

CMSC 110 Introductory Computer Programming. (3) Two lectures and one two-hour laboratory period each week. Construction of algorithms for the efficient solution of computational problems. Elements of Fortran. Programming techniques and implementation, including debugging and documentation.

CMSC 120 Intermediate Computer Programming. (3) Prerequisite, CMSC 110 or equivalent. Two lectures and one two-hour laboratory period each week. Elements of structured programming. Program design, testing, and documentation. Development of large programs.

CMSC 210 Assembly Language Programming. (3) Two lectures and one two-hour laboratory period per week. Prerequisite, CMSC 120 or equivalent. Logical basis of computer structure, machine representation of numbers and characters, flow of control, instruction codes, arithmetic and logical operations, indexing and indirect addressing, input-output, push-down stacks, symbolic representation of progams and assembly systems, subroutine linkage, macros, interpretive systems, and recent advances in computer organization. Several computer projects to illustrate basic concepts.

CMSC 220 Introduction to File Processing. (3) Prerequisite, CMSC 120 or equivalent. Characteristics and use of peripheral memory devices for sequential and direct access file processing. Techniques such as sorting and searching, hash coding, and table look-up.

CMSC 250 Introduction to Discrete Structures. (3) Prerequisite, CMSC 110 and MATH 111 or equivalent. Fundamental mathematical concepts and algebraic structures, such as sets, relations, functions, semigroups, monoids, and Boolean algebras. Introduction to the theory of graphs and trees and their realization as computer programs. Emphasis on examples and applications rather than mathematical rigor.

CMSC 268 Numerical Calculus Laboratory. (1-2) Two hours laboratory per week for each credit hour. Prerequisite, MATH 240, or concurrent registration therein and CMSC 110, or equivalents. Laboratory work in the development of algorithmic solutions of problems taken from numerical calculus with emphasis on efficiency of computation, and the control of errors. Basic one-credit laboratory includes completion of several machine projects on material related to MATH 240. Second credit involves more comprehensive projects based on similar or related material.

CMSC 388 Special Computational Laboratory. (1-2) Two hours laboratory per week for each credit hour. Prerequisite, CMSC 103 or equivalent. Arranged for special groups of students to give experience in developing algorithmic solutions of problems or using particular computational systems. May be taken for cumulative credit up to a maximum of six hours where different material is covered.

CMSC 390 Honors Paper. (3) Prerequisite, admission to CMSC honors program. Special study or research directed toward preparation of honors paper.

CMSC 400 Introduction to Computer Languages and Systems. (3) Prerequisite, MATH 241 or equivalent. A terminal course suitable for non-CMSC majors with no programming background. Organization and characteristics of computers. Procedure oriented and assembly languages. Representation of data, characters and instructions. Introduction to logic design and systems organization. Macro definition and generation. Program segmentation and linkage. Extensive use of the computer to complete projects illustrating programming techniques and machine structure. (CMSC 400 may not be counted for credit in the graduate program in computer science.)

CMSC 410 Computer Organization. (3) Prerequisite, CMSC 210 or equivalent. This is the same course as ENEE 440. Introduction. Computer elements. Parallel adders and subtracters. Micro-operations. Sequences. Computer simulation. Organization of a commercially available stored program computer. Microprogrammed computers. A large-scale batch-processing system.

CMSC 415 Systems Programming. (3) Prerequisite, CMSC 220, 410. Basic algorithms of operating system software. Memory management using linkage editors and loaders, dynamic relocation with base registers, paging. File systems and input/output control. Processor allocation for multiprogramming, time-sharing. The emphasis of the course is on practical systems programming, including projects such as a simple linkage editor, a stand-alone executive, a file system, etc.

CMSC 420 Data Structures. (3) Prerequisite, CMSC 220 or equivalent. Description, properties, and storage allocation of data structures including lists and trees. Algorithms for manipulating structures. Applications from areas such as data processing, information retrieval, symbol manipulation, and operating systems.

CMSC 440 Structure of Programming Languages. (3) Prerequisite, CMSC 210 or equivalent. Formal definition of languages including specification of syntax and semantics. Syntactic structure and semantics of simple statements including precedence, infix, prefix, and postfix notation. Global structure and semantics of algorithmic langauges including declarations and storage allocation, grouping of statements and binding time of constituents, subroutines, coroutines, tasks and parameters. List processing and data description languages.

CMSC 445 Compiler Writing. (3) Prerequisites, CMSC 220, 440. A detailed examination of a compiler for an algebraic language designed around the writing of a compiler as the major part of the course. Topics covered in the course include a review of scanning and parsing, the examination of code generation, optimization and error recovery, and compiler-writing techniques such as bootstrapping and translator writing systems.

CMSC 450 Elementary Logic and Algorithms. (3) Prerequisite, MATH 240 or consent of instructor. This is the same course as MATH 444. An elementary development of propositional logic, predicate logic, set algebra, and Boolean algebra, with a discussion of Markov algorithms, turing machines and recursive functions. Topics include post productions, word problems, and formal languages.

CMSC 452 Elementary Theory of Computation. (3) Prerequisites, CMSC 120, 250. This course is intended to serve two purposes: (1) An introduction to the theory of computation, and (2) a tie between many abstract results and their concrete counterparts. This course establishes a theoretical foundation for the proper understanding of the inherent limitations and actual power of digital computers. Also, it provides a relatively uniform way of stating and investigating problems that arise in connection with the computation of particular functions and certain classes of functions. Topics covered include an introductory treatment of classes of computable functions, computability by register machines, computability by turing machines, unsolvable decision problems, concrete computational complexity, and complexity of loop programs.

CMSC 455 Elementary Formal Language Theory. (3) Prerequisites, CMSC 120, 250. This course is intended to serve as an introduction to the theory of formal languages. This theory is encountered in the study of both programming languages and natural languages, and consequently will be useful in numerous other courses in computer science at the undergraduate and graduate levels. Topics covered include the highlights of Chomsky's hierarchy of grammars and Chomsky's hierarchy of languages, a summary treatment of acceptors related to these languages, and a brief introduction to the theory of transformational grammars.

CMSC 460 Computational Methods. (3) Prerequisite, MATH 241 and CMSC 110, or equivalent. Basic computational methods for interpolation, least squares, approximation, numerical quadrature, numerical solution of polynomial and transcendental equations, systems of linear equations and initial value problems for ordinary differential equations. Emphasis on the methods and their computational properties rather than on their analytic aspects. (Listed also as MAPL 460.)

CMSC 470 Numerical Mathematics — Analysis. (3) Prerequisites, MATH 240 and 241; CMSC 110 or equivalent. This course with MAPL/CMSC 471, forms a one-year introduction to numerical analysis at the advanced undergraduate level. Interpolation, numerical differentiation and integration, solution of nonlinear equations, acceleration of convergence, numerical treatment of differential equations. Topics will be supplemented with programming assignments. (Listed also as MAPL 470.)

CMSC 471 Numerical Mathematics — Linear Algebra. (3) Prerequisites, MATH 240 and 241; CMSC 110 or equivalent. The course, with MAPL/CMSC 470, forms a one-year introduction to numerical analysis at the advanced undergraduate level. Direct solution of linear systems, norms, least squares problems, the symmetric eigenvalue problem, basic iterative methods. Topics will be supplemented with programming assignments. (Listed also as MAPL 471.)

CMSC 475 Combinatorics and Graph Theory. (3) Prerequisite, MATH 240 or equivalent. General enumeration methods, difference equations, generating functions. Elements of graph theory to transport networks, matching theory and graphical algorithms. (Listed also as MATH 475.)

CMSC 477 Optimization. (3) Prerequisite, CMSC 110, and MATH 405 or MATH 474. Linear Programming including the simplex algorithm and dual linear programs, convex sets and elements of convex programming, combinational optimization integer programming. (Listed also as MAPL 477.)

CMSC 480 Simulation of Continuous Systems. (3) Prerequisite, CMSC 280 or equivalent. Introduction to digital simulation; simulation by mimic programming; simulation by Fortran programming; simulation by DSL/90 (or CSMP) programming; logic and construction of a simulation processor; similarity between digital simulations of continuous and discrete systems.

CMSC 498 Special Problems in Computer Science. (1-3) Prerequisite, permission of instructor. An individualized course designed to allow a student or students to pursue a specialized topic or project under the supervision of the senior staff. Credit according to work done.

Consumer Economics

CNEC 100 Introduction to Consumer Economics. (3) The role of the consumer in modern society. Topics include the consumer in the market, the impact of market failures on the quality of life and the impact of government and business' decisions on consumer welfare.

CNEC 385 Junior Honors Seminar. (1) Spring semester. Limited to juniors in the departmental honors program. Readings, reports and discussion of selected topics.

CNEC 396 Field Work and Analysis in Consumer Economics. (3-6) Supervised, professional field work experience in business, industry, government or education. A seminar and a written critique of the field work experience will be required to relate formal academic study to student work experiences. Students must apply a semester in advance and enrollment is by permission of the department and is limited to majors.

CNEC 431 The Consumer and the Law. (3) Three lectures a week. A study of legislation affecting consumer goods and services. Topics covered include product safety and liability, packaging and labeling, deceptive advertising, and consumer credit. The implications of such legislation for consumers' welfare with particular emphasis on the disadvantaged groups in our society will be examined.

CNEC 435 Economics of Consumption. (3) Spring semester. Three lectures per week. Prerequisite, ECON 201 and 203 or ECON 205 for non-majors. The application of economic theory to a study of consumer decision-making and its role in a market economy at both the individual and aggregate levels. Topics covered include empirical studies of consumer spending and saving.

the consumer in the market and collective consumption.

CNEC 437 Consumer Behavior. (3) Three lectures per week. Prerequisites, PSYC 100 and SOCY 100. An application of the behavioral sciences to a study of consumer behavior. Current theories, models and empirical research findings are explored.

CNEC 455 Consumer Technology: Product Standards. (3) Prerequisite, consent of instructor. The process of product standard development, and the significance of such standards to the consumer. History, procedures and uses of standards by industry and government, including both voluntary and regulatory standardization; the impact of product standards, and mechanisms for obtaining consumer input in the standardization process.

CNEC 488 Senior Honors Thesis. (1-4) Limited to undergraduate students in the departmental honors program. An independent literary, laboratory or field study, conducted throughout the student's senior year. Student should register in both fall and spring.

CNEC 498 Special Studies. (2-4) Independent study by an individual student or by a group of students in advanced work not otherwise provided in the department. Students must prepare a description of the study they wish to undertake. The plan must be approved by the faculty directing the study and the department chairman.

Cooperative Education Program

COOP 208 Coop Work Experience I. (0) Prerequisites, satisfactory completion of 36 credits; and consent of the director of the cooperative education program. Practical, full-time work experience in either private or government agencies which supplements and enhances the theories, principles and practices in the normal education program. The student must register for COOP 208 for each summer work experience and for both COOP 208 and 209 for each semester work experience.

COOP 209 COOP Work Experience II. (0) Prerequisites, satisfactory completion of 36 credits; and consent of the director of the cooperative education program. Practical, full-time work experience in either private or government agencies which supplements and enhances the theories, principles and practices in the normal education program. The student must register for COOP 208 for each summer work experience and for both COOP 208 and 209 for each semester work experience.

Crafts

CRAF 101 Craft Fundamentals and Materials. (3) Three laboratory periods. Prerequisite, APDS 101 or equivalent. Introduction to materials and techniques. Recognition of design limitations imposed by inherent quality of materials.

CRAF 102 Recreational Crafts. (2) Two laboratory periods. Problems to encourage creative expression in variety of materials. Emphasis on achievement of aesthetic quality in use of easily available materials, simple tools. Suitable for non-majors.

CRAF 202 Creative Crafts. (3) Three studio periods. Prerequisite, CRAF 101 or 102. Problems to stimulate creative experimentation as approach to design. Work with paper, fabric, clay, wood, metal.

CRAF 220 Ceramics I — Materials and Processes. (3) Three studio periods. Prerequisites, APDS 101 and consent of the instructor. Fundamental preparation and use of clay. Execution of original designs while developing elementary skills in the production of clay sculpture and pottery.

CRAF 230 Metalry I. (3) Three studio periods. Prerequisites, APDS 101 plus one additional design course, or equivalent. Opportunity to develop basic skills in the execution of creatively conceived design problems in copper, pewter and silver. Standards of craftsmanship as they relate to design quality.

CRAF 240 Weaving. (3) Three studio periods. Prerequisites, APDS 101, 102 or equivalent, TEXT 105. Basic weaves, patterns drafts. Creative weaving as a study of texture, pattern and color appropriate to purpose.

CRAF 241 Decorative Textiles. (3) Three studio periods. Prerequisites, APDS 101, 102 or equivalent. Execution of original designs appropriate to textile decoration, fibers and fabrics and to the process involved (i.e., batik, block printing, silk screen, stitchery, and applique).

CRAF 320 Advanced Ceramics I. (3) Three studio periods. Prerequisite, CRAF 220. Experience in experimental development of body and textures, glazes and colors, and their utilization in clay products of original design. Calculation of body and glaze composition.

CRAF 330 Advanced Metalry I. (3) Three studio periods. Prerequisite, CRAF 230. Advanced application of skills to design and fabrication of metals: jewelry, stone setting, metal casting, and forming.

CRAF 340 Advanced Weaving/Textile Design. (3) Two studio periods. Prerequisite, CRAF 240. Execution of original textile designs which reflect the demands both of the custom market and of mass production. Problems chosen with the consent of instructor.

CRAF 341 Advanced Weaving/Textile Design. (3) Two studio periods. Prerequisite, CRAF 241. Execution of original textile designs which reflect the demands both of the custom market and of mass production. Problems chosen with the consent of instructor.

CRAF 420 Advanced Ceramics II. (3) Three studio periods. Prerequisite, CRAF 330. Experience in experimental development of body and textures, glazes and colors and their utilization in clay products of original design. Calculation of body and glaze composition.

CRAF 428 Individual Problems in Ceramics. (3) Prerequisites, CRAF 220, 320, 420. Open to students with demonstrated ability and with the potential for a high level of achievement in studio production or in research. Total undergraduate credit permitted in all individual problems courses in crafts is a maximum of nine hours. Consent of crafts faculty. No less than B average on prerequisites and presentation of work for evaluation.

CRAF 430 Advanced Metalry II. (3) Two studio periods. Prerequisite, CRAF 330. Advanced application of skills to the design and fabrication of metals: jewelry, stone setting, metal casting, cloisonne, hand-raised hollow.

CRAF 438 Individual Problems in Metalry. (3) Prerequisites, CRAF 230, 330, 430 with at least a grade of B in all three courses. Open to students with demonstrated ability and with the potential for a high level of achievement in studio production or in research. Total undergraduate credit permitted in all individual problems courses in crafts is a maximum of nine hours. Consent of crafts faculty. No less than B average on prerequisites and presentation of work for evaluation.

CRAF 448 Individual Problems in Textile Design. (3) Prerequisites, CRAF 240, 241, 340, or 341 with at least a grade of B in all three courses. Open to students with demonstrated ability and with the potential for a high level of achievement on studio production or in research. Total undergraduate credit permitted in all individual problems courses in crafts is a maximum of nine hours. Consent of crafts faculty. No less than B average on prerequisites and presentation of work for evaluation.

Criminology

CRIM 220 Criminology. (3) Prerequisites, SOCY 100 and sophomore standing. Criminal behavior and the methods of its study; causation; typologies of criminal acts and offenders; punishment, correction and incapacitation; prevention of crime.

CRIM 359 Field Training in Criminology and Corrections. (1-3) Prerequisites, SOCY 100; for crime control field training, CRIM 220 and CRIM 450. Enrollment restricted to available placements. Supervised field training in public and private social agencies. The student will select his particular area of interest and be responsible to an agency for a definite program of in-service training. Group meetings, individual conferences and written program reports will be a required part of the course.

CRIM 388 Independent Reading Course in Criminology. (3) H — Honors. Prerequisite, SOCY 100. For honors students only. This course is designed for the needs of honors students in criminology.

CRIM 389 Independent Research in Criminology. (3) H — Honors. Prerequisite, SOCY 100. For honors students only. This course is designed for the needs of the honors student in criminology.

CRIM 399 Independent Study in Criminology. (1-6) Prerequisites, written consent of faculty under whose direction the study is to be performed, and at least 12 hours of criminology credit. Integrated reading or research under direction and supervision of faculty member.

CRIM 432 Law of Corrections. (3) Prerequisite, LENF 230 or 234 and CRIM 220. A review of the law of criminal corrections from sentencing to final release or release on parole. Probation, punishments, special treatments for special offenders, parole and pardon, and the prisoner's civil rights are also examined.

CRIM 450 Juvenile Delinquency. (3) Prerequisite, SOCY 100. Juvenile delinquency in relation to the general problem of crime; analysis of factors underlying juvenile delinquency; treatment and prevention.

CRIM 451 Crime and Delinquency Prevention. (3) Prerequisites, CRIM 220 or consent of instructor. Methods and programs in prevention of crime and delinquency.

CRIM 452 Treatment of Criminals and Delinquents in the Community. (3) Prerequisite, CRIM 220 or CRIM 450 or consent of instructor. Analysis of the processes and methods in the modification of criminal patterns of behavior in a community setting.

CRIM 453 Institutional Treatment of Criminals and Delinquents. (3) Prerequisite, CRIM 220 or CRIM 450 or consent of instructor.

History, organization and functions of penal and correctional institutions for adults and juveniles.

CRIM 454 Contemporary Criminological Theory. (3) Prerequisite, CRIM 220, CRIM 450, and CRIM 451 or CRIM 452 or CRIM 453. Brief historical overview of criminological theory up to the 50's. Deviance, labeling, typologies. Most recent research in criminalistic subcultures and middle class delinquency. Recent proposals for 'decriminalization'.

CRIM 498 Selected Topics in Criminology. (3) Topics of special interest to advanced undergraduates in criminology. Such courses will be offered in response to student request and faculty interest. No more than six credits may be taken by a student in selected topics.

Dance

DANC 100 Dance Techniques. (2) A study of dance movement in terms of placement, rhythm, dynamics, space, improvisation, and dance phrases.

DANC 102 Rhythmic Invention for Dance. (2) Prerequisite, DANC 104 or equivalent. A course designed to show how rhythm affects the total dance movement picture and develops the dancer's rhythmic awareness and response. Understanding of rhythmic principles, movement isolation, design, phrasing, syncopation.

DANC 104 Dance Techniques. (2) Further development of the materials in DANC 100. Prerequisite, DANC 100 or equivalent.

DANC 110 Introductory Exploration in Dance. (3) Technique, improvization, and theory of dance for beginning non-major students. Films, lectures.

Hours in fine arts for the general education requirement.

DANC 199 Workshop. (1-2) Admission by consent of instructor. Planning, choreography and presentation of demonstrations and concerts. May be repeated for credit until eight credits have been earned.

DANC 200 Introduction to Dance. (3) Three lectures a week. A study of dance as a form of communication and as an art form. The course includes a survey of the theories and styles of dance, and of their relationships to other art forms. Lectures will be supplemented by observations, films, and guest speakers.

DANC 208 Elementary Dance Composition. (3) Prerequisite, DANC 104 or equivalent. The study of basic principles of dance composition in terms of space, time, dynamics, and movement invention. The development of critical awareness and judgement with regard to composing.

DANC 248 Dance Techniques. (2) A — Modern. B — Ballet. Prerequisite, DANC 104 or equivalent. A study of dance techniques and styles.

DANC 265 Elementary Dance Notation. (3) Prerequisite, DANC 104 or equivalent. Movement analysis for purposes of recording dance; notation fundamentals; elementary writing of technique; reading of simple folk, modern and ballet studies.

DANC 284 Movement for the Theatre. (3) Lecture and laboratory. Prerequisite, one semester of dance technique. Movement for actors, dancers, directors, singers in the theatre. Dynamics, qualities, styles, and space as related to movement on the stage.

DANC 290 Improvisation. (2) Improvisation as an introduction and extension of materials in movement necessary to the choreographic process. Development of the ability to improvise.

DANC 305 Development of Dance Progression. (3) Prerequisite, DANC 208 or equivalent. The application and building of dance progression both in terms of dance techniques and in choreographic studies. Students have the opportunity to observe and assist the instructor in conducting lower level dance classes.

DANC 348 Dance Techniques. (2) A — Modern. B — Ballet. C — Jazz. Further development of materials in DANC 248. Prerequisite, DANC 248 and 208 or equivalent.

DANC 365 Intermediate Notation. (3) Prerequisite, DANC 265 or equivalent. Further development of materials in DANC 265, reading of scores, writing scores, performing from scores.

DANC 389 Dance Techniques. (1-2) Prerequisite, DANC 348 or equivalent. Continuation of DANC 348 in further advanced form. May be repeated for credit.

DANC 400 Advanced Choreographic Forms. (3) Prerequisite, DANC 208 or equivalent and adequate dance technique. Lectures and studio work in modern sources as they apply to dance. Solo and group choreography.

DANC 458 Group Forms. (3) Prerequisite, DANC 400 or equivalent. Choreography for small groups; duets, trios, quartets, etc.

DANC 465 Advanced Notation. (3) Prerequisite, DANC 365 or equivalent. Continuation of materials in DANC 365 in more intensive work. The translation, writing, and performing of advanced scores in the various forms of dance.

DANC 468 Repertory. (3) The learning of dances to be chosen from notated scores, works of visiting artists, or selected faculty choreography to be performed on at least one concert. Audition required. The course may be repeated for credit, as different works will be chosen each semester.

DANC 470 Creative Dance for Children. (3) Prerequisite, DANC 208 and 305 or equivalent. Directing the essential elements of dance to the level of the child's experience and facilitating the creative response. The development of movement into simple forms to serve as a symbol of individual expression.

DANC 478 Dance Production. (3) Prerequisite, DANC 388 or equivalent and an adequate understanding of dance techniques. Advanced choreography. Independent work with periodic criticism.

DANC 482 History of Dance. (3) The development of dance from primitive to the Middle Ages and the relationship of dance forms to patterns of culture.

DANC 483 History of Dance. (3) The development of dance from the Renaissance period to the present times and the relationship of dance forms to patterns of culture.

DANC 484 Theory and Philosophy of Dance. (3) The study of the theories, philosophies and aesthetics of dance. Investigation of form, content and structure. Interrelationships of the arts, and their role in man's world.

DANC 488 Practicum in Dance. (1-6) Advanced workshop in dance presentation including performing, production, and planned field experiences. Repeatable to a maximum of six credits.

DANC 489 Ethnic Styles. (3) Prerequisite, DANC 104. Lecture and activity in styles expressive of various cultures. May be repeated for credit by permission of instructor.

DANC 492 Percussion and Music Sources for Dance. (3) Prerequisite, DANC 102 or equivalent or permission. Techniques of percussion playing, and its use as dance accompaniment. Learning to use the instruments in composition and improvisation. Study of music sources for dance.

DANC 498 Directed Studies in Dance. (1-6) Hours arranged. For advanced students who have the permission of the chairman of the department of dance.

499 Advanced Dance Technique. (2) Prerequisite, DANC 389 or equivalent Continuation of DANC 389 in further advanced form.

Dramatic Art

DART 110 Introduction to the Theater. (3) A general survey of the fields of the theater.

DART 120 Acting. (3) Prerequisite, consent of instructor. Basic principles of histrionic practice.

DART 170 Stagecraft. (3) Fundamentals of technical production. Emphasis on construction of scenery.

A — For dramatic art majors only.

DART 180 Make-Up. (2) One lecture and one laboratory period a week. A lecture-laboratory course in theory and practice of stage make-up, covering basic requirements as to age, type, character, race, and period

DART 220 Intermediate Acting. (3) Prerequisite, DART 120 and permission of instructor. Instruction, study, and practice in the science of blueprinting character development in a full length play for performance purposes.

DART 252 Historic Costuming for the Stage. (3) A study of costume for men and women from the ancient times to the present in relation to the artistic, social, economic and political influences of the times with particular emphasis on those periods which are most useful in theatrical production.

DART 253 Costume Crafts. (3) The study of fabrics and garment construction and their application to the theatre techniques; included are pattern drafting, cutting, fitting, and finishing.

DART 273 Scenographic Techniques. (3) Prerequisite, DART 170. The translation of the artistic idea of the stage design into effective drawings for the execution of stage settings. Includes drafting for the stage, scene painting techniques, and practice in the mechanical visualization of scenic elements.

DART 311 Play Production. (3) Prerequisite, DART 110 or consent of instructor. Development of procedure followed by the director in preparing plays for public performance.

DART 330 Play Directing. (3) Prerequisite, DART 120 or consent of instructor. A lecture-laboratory course dealing with the fundamentals of script cutting, pacing, movement, blocking, and rehearsal routine as applied to the directing of plays.

DART 351 Stage Decor. (3) Prerequisite, DART 214. A study of environmental decor and ornaments through the ages and its practical reproduction for a theatrical production.

DART 375 Stage Design. (3) Prerequisite, DART 170 or consent of instructor. The theory of stage design and lighting. Making of plans as coordinate elements of scenic design.

DART 420 Styles and Theories of Acting. (3) Prerequisite, DART 120 or consent of instructor. The study and application of historical styles and theories of acting.

DART 430 Play Directing. (3)

DART 440 Children's Dramatics. (3) Principles and methods necessary for staging children's production on the elementary school level. Major emphasis on creative dramatics, the application of creative dramatics in the school room, and the values gained by the child in this activity. Students will conduct classes in formal and creative dramatics which will culminate in children's programs.

A — For dramatic arts majors only

DART 451 Advanced Scenic Design. (3) Prerequisite, DART 330, 375, 475, 480 or permission of instructor. Design of stage settings, and of one total production. Study of stage design of the main historical periods and in the contemporary theatre.

DART 476 Principles and Theories of Stage Lighting. (3) Prerequisite, DART 375. A study of composition, control, and instrumentation in theatrical lighting.

DART 479 Theater Workshop. (1-3) Prerequisite, DART 170. A laboratory course designed to provide advanced theatre students with practical experience in a supervisory capacity in all phases of theatre production. May be repeated to a maximum of six credit hours.

DART 480 Stage Costuming I. (3) Prerequisite, DART 252. Basic principles of stage costuming.

DART 481 Stage Costuming II. (3) Prerequisite, DART 480. The advanced study of stage costuming through the development of style as a design consideration in theatrical productions. Designing costumes for various forms of drama, including period-styles.

DART 490 History of the Theater. (3) A survey of dramatic production from early origin to 1800.

DART 491 History of the Theater. (3) A survey of dramatic production from 1800 to the present.

DART 499 Seminar. (3) Prerequisites, senior standing and consent of instructor. Present-day drama research.

Human and Community Resources

DHCR 201 Inquiries into the Future of the Community. (3) Interdisciplinary lecture-discussion. Explorations of future developments from the viewpoint of a number of disciplines particularly those represented by the division of human and community resources.

DHCR 288 Special Topics in Human and Community Resources. (3) Topics in interdisciplinary areas relevant to the study of human and community resources. Repeatable to a maximum of six credits if the subject matter is different.

DHCR 488 Selected Topics in Human and Community Resources. (3) Topics in interdisciplinary areas relevant to the study of human and community resources. Repeatable to a maximum of six credits if the subject matter is different.

Economics

ECON 105 Economics of Social Problems. (3) An introduction to modern economic and social problems; their nature, causes, and policy implications. Closed to students who have taken two of ECON 201, 203, or 205.

ECON 201 Principles of Economics I. (3) An introduction to the problems of unemployment, inflation, and economic growth. Emphasis is placed on the roles of monetary and fiscal policy in the conduct of macro-economic policy. The efficacy of wage and price controls is analyzed.

ECON 203 Principles of Economics II. (3) This course emphasizes the behavior of individual consumers and business firms, problems of international trade and finance, the distribution of income, policies for eliminating poverty and discrimination, the problems of environmental pollution, and the impact of different market structures upon economic activity (Students are advised to take ECON 201 before ECON 203.)

ECON 205 Fundamentals of Economics. (3) (Not open to students who have credit in ECON 201. Credit will be given for either 201 or 205, but not for both. Students in the college of business and management are required to take ECON 201, and should not take 205.) A one-semester introduction, for non-majors, to the principles of economics and their applications to the leading economic problems of society, including inflation, unemployment, population, poverty, urban renewal, inequality, monopoly, environmental protection, international trade, imperialism, economic planning, and comparative economic systems.

ECON 307 Development of Economic Ideas: Social Issues and Political Applications. (3) Prerequisite, ECON 201 or 205. The development of economic ideas with particular reference to their relationship with social history, contemporary politico-economic problems, underlying philosophies, view of the human prospect, methods of analysis, and the role of values. Marx, Marshall, Veblen, Schumpeter, Keynes, Samuelson, Friedman, Galbraith, Myrdal, Joan Robinson, and others.

ECON 310 Evolution of Modern Capitalism in Western Europe and the United States. (3) The evolution of the capitalist system from its medieval origins to the present. Emphasis on dynamic forces of cumulative change in capitalism, including capital accumulation, technology, expansion of markets, the corporate form of private property in the means of production, and the relation of capitalism to war and revolution.

ECON 395 Honors Seminar. (3) Normally taken in the junior year. Prerequisite, candidacy for honors in economics. Selected topics are investigated and written reports are submitted.

ECON 396 Independent Honors Study. (3) Normally taken in the senior year. Prerequisites, ECON 395 and candidacy for honors in economics. Integrated reading under staff direction. Leading to the preparation of a thesis in Economics 397.

ECON 397 Honors Thesis. (3) Prerequisites, ECON 396 and candidacy for honors in economics. General supervision will be provided through assembled meetings with the professor in charge of the course.

ECON 398 Topics in Economics. (3) This course is designed to meet the changing interests of students and staff. Topics vary in response to those interests. This course may be repeated for credit when the subject matter changes. Students are advised to seek information about the coverage and prerequisites during the registration period. Repeatable to a maximum of six hours.

ECON 399 Individual Reading and Research for Undergraduates. (3) Prerequisite, six hours of upper-division economics courses. By arrangement with individual faculty members. This course is designed for students desiring specialized instruction and guidance in subjects not covered in the course offerings. Before enrollment, the student must secure agreement from an individual faculty member to act as his supervisor. A program of reading, research and evaluation will be worked out between the student and the faculty member. Repeatable to a maximum of six credits.

ECON 401 National Income Analysis. (3) Prerequisite, ECON 201, 203. Required for economics majors. Analysis of the determination of national income, employment, and price levels. Discussion of consumption, investment, inflation, and government fiscal and monetary policy.

ECON 402 Business Cycles. (3) First semester. Prerequisite, ECON 430. A study of the causes of depressions and unemployment, cyclical and secular instability, theories of business cycles, and the problem of controlling economic instability.

ECON 403 Intermediate Price Theory. (3) Prerequisite, ECON 201, 203. Required for economics majors. An analysis of the theories of consumer behavior and of the firm, and of general price and distribution theory, with applications to current economic issues.

ECON 407 Contemporary Economic Thought. (3) Prerequisites, ECON 201, 203, and senior standing. Graduate students should take ECON 705. A survey of the development of economic thought since 1900 with special reference to Thorstein Veblin and other pre-1939 institutionalists and to post-1945 neo-institutionalists such as J. K. Galbraith and Gunnar Myrdal.

ECON 411 American Economic Development. (3) Prerequisites, ECON 201 and 203, or 205. Long-term trends in the American economy and analysis of the sources of output growth. Technological changes and the diffusion of new technologies. These subjects are discussed in the context of theoretical models.

ECON 415 Introduction to Economic Development of Underdeveloped Areas. (3) Prerequisite, ECON 201 and 203, or 205. An analysis of the economic and social characteristics of underdeveloped areas. Recent theories of economic development, obstacles to development, policies and planning for development.

ECON 418 Economic Development of Selected Areas. (3) A — Latin America. B — Asia. C — Africa. Prerequisite, ECON 415. Institutional characteristics of a specific area are discussed and alternate strategies and policies for development are analyzed.

ECON 421 Economic Statistics. (3) Prerequisite, MATH 110 or equivalent. Not open to students who have taken BMGT 230 or BMGT 231. An introduction to the use of statistics in economics. Topics include: probability, random variables and their distributions, sampling theory, estimation, hypothesis testing, analysis of variance, regression analysis, correlation.

ECON 422 Quantitative Methods in Economics. (3) Prerequisites, ECON 201, 203, and 421 (or BMGT 230); or permission of instructor. Emphasizes the interaction between the economic problems posed by economists and the assumptions employed in statistical theory. Deals with the formulation, estimation and testing of economic models. Topics include single variable and multiple

variable regression techniques, theory of identification, autocorrelation and simultaneous equations. Independent work relating the material in the course to an economic problem chosen by the student is required.

ECON 425 Mathematical Economics. (3) Prerequisites, ECON 401 and 403 and one year of college mathematics. A course designed to enable economics majors to understand the simpler aspects of mathematical economics. Those parts of the calculus and algebra required for economic analysis will be presented.

ECON 430 Money and Banking. (3) Prerequisite, ECON 201, 203. Relation of money and credit to economic activity and prices; impact of public policy in financial markets and for goods and services; policies, structure, and functions of the federal reserve system; organization, operation, and functions of the commercial banking system, as related particularly to questions of economic stability and public policy.

ECON 431 Theory of Money, Prices and Economic Activity. (3) Prerequisite, ECON 430. A theoretical treatment of the influence of money and financial markets on economic activity and prices, and of the effects of monetary policy of the markets for goods and services; the role of money in the classical and Keynesian macro-systems; topics of theoretical interest in monetary policy formation and implementation.

ECON 440 International Economics. (3) Prerequisite, ECON 201, 203. A descriptive and theoretical analysis of international trade, balance of payments accounts, the mechanism of international economic adjustment, comparative costs, economics of customs unions.

ECON 441 International Economic Policies. (3) Prerequisites, ECON 401, 403, and 440. Contemporary balance of payments problems; the international liquidity controversy; investment, trade and economic development; evaluation of arguments for protection.

ECON 450 Introduction to Public Finance. (3) Prerequisite, ECON 201, 203; or ECON 205. The role of federal, state, and local governments in meeting public wants. Analysis of tax theory and policy, expenditure theory, government budgeting, benefit-cost analysis, and income redistribution.

ECON 451 Public Choice and Public Policy. (3) Prerequisite, ECON 201, 203, or 205. Analysis of collective decision-making, economic models of government, program budgeting, and policy implementation; emphasis on models of public choice and institutions which affect decision-making.

ECON 454 State and Local Public Finance. (3) Prerequisite, ECON 201 and 203; or 205. Principles and problems of governmental finance with special reference to state and local jurisdictions. Topics to be covered include taxation, expenditures and intergovernmental fiscal relations.

ECON 460 Industrial Organization. (3) Prerequisite, ECON 201 and 203; or 205. Changing structure of the American economy; price policies in different industrial classifications of monopoly and competition in relation to problems of public policy.

ECON 461 Economics of American Industries. (3) Prerequisite, ECON 201 and 203; or 205. A study of the technology, economics and geography of representative American industries.

ECON 470 Labor Economics. (3) Prerequisites, ECON 201 and 203; or 205. A survey of labor force growth and composition, problems of unemployment and labor market operations, theories of wage determination, the wage-price spiral, collective bargaining, governmental regulation of employment and labor relations, and the history and characteristics of the American labor movement.

ECON 471 Current Problems in Labor Economics. (3) Prerequisite, ECON 470. For students who wish to pursue, in depth, selected topics in the labor field. Issues and topics selected for detailed examination may include: manpower training and development, unemployment compensation and social security, race and sex discrimination in employment, wage theory, productivity analysis, the problems of collective bargaining in public employment, wage-price controls and incomes policy.

ECON 474 Economic Problems of Women. (3) Prerequisite, ECON 201, 203, or 205. Discrimination against women in the labor market; the division of labor in the home and the workplace by sex; the 'child care industry'; women in poverty.

ECON 475 Economics of Poverty and Discrimination. (3) Prerequisite, ECON 201 and 203; or 205. Topics include the causes of the persistence of low income groups; the relation of poverty to technological change, to economic growth, and to education and training; economic motivations for discrimination; the economic results of discrimination; proposed remedies for poverty and discrimination.

ECON 480 Comparative Economic Systems. (3) Prerequisite, ECON 201 and 203; or 205. An investigation of the theory and practice of various types of economic systems. An examination and evaluation of the capitalistic system followed by an analysis of alternative types of economic systems such as fascism, socialism, and communism.

ECON 482 Economics of the Soviet Union. (3) Prerequisite, ECON 201 and 203; or 205. An analysis of the organization, operating principles and performance of the Soviet economy with attention to the historical and ideological background, planning, resources, industry, agriculture, domestic and foreign trade, finance, labor, and the structure and growth of national income.

ECON 484 The Economy of China. (3) Prerequisite, ECON 201 and 203; or 205. Policies and performances of the Chinese economy since 1949. Will begin with a survey of modern China's economic history. Emphasizes the strategies and institutional innovations that the Chinese have adopted to overcome the problems of economic development. Some economic controversies raised during the 'cultural revolution' will be covered in review of the problems and prospects of the present Chinese economy.

ECON 486 The Economics of National Planning. (3) Prerequisite, ECON 201 and 203; or 205. An analysis of the principles and practice of economic planning with special reference to the planning problems of west European countries and the United States.

ECON 490 Survey of Urban Economic Problems and Policies. (3) Prerequisites, ECON 201 and 203; or 205. An introduction to the study of urban economics through the examination of current policy issues. Topics may include suburbanization of jobs and residences, housing and urban renewal, urban transportation, development of new towns, ghetto economic development, problems in services such as education and police.

ECON 491 Economics and Control of Urban Growth. (3) Prerequisite, ECON 390. An analysis of metropolitan development processes, the consequences of alternative growth patterns, and the evaluation of policies to control growth.

ECON 492 Economics of Location and Regional Growth. (3) Prerequisite, ECON 403, or consent of instructor. Study of the theories, problems, and policies of regional economic development and the location of economic activity for both rural and metropolitan regions. Methods of regional analysis.

Education Administration, Supervision and Curriculum

EDAD 440 Utilization of Educational Media. (3) Survey of classroom uses of instructional media. Techniques for integrating media into instruction. Includes preparation of a unit of instruction utilizing professional and teacher produced media.

EDAD 441 Graphic Materials for Instruction. (3) Prerequisite, EDAD 440 or consent of instructor. A laboratory course which combines graphic and photographic processes for education and training purposes. Techniques include lettering, coloring, transparencies, illustrations, converting, duplicating transparent and opaque media. Emphasis is placed on appropriate media selection for target audiences. Heavy student project orientation.

EDAD 442 Instructional Media Services. (3) Prerequisites, teaching experience and EDAD 440, or equivalent. Procedures for coordinating instructional media programs; instructional materials acquisition, storage, scheduling, distribution, production, evaluation and other service responsibilities; instructional materials center staff coordination of research, curriculum improvement and faculty development programs.

EDAD 443 Instructional Television Utilization. (3) Combining televised lessons, on-campus seminars, and related workbook assignments, this course focuses upon planning for the various uses of instructional television with students. State, local school unit, school, and classroom uses will be illustrated through film and studio production. The aspects of producing ITV programs are developed through the television lessons and 'hands-on' assignments of the seminars.

EDAD 444 Programmed Instruction. (3) Analysis of programmed instruction techniques: selection, utilization and evaluation of existing programs and teaching machines; developing learning objectives; writing and validating programs.

EDAD 489 Field Experience in Education. (1-4) Prerequisites, at least six semester hours in education at the University of Maryland plus such other prerequisites as may be set by the major area in which the experience is to be taken. Planned field experience may be provided for selected students who have had teaching experience and whose application for such field experience has been approved by

the education faculty. Field experience is offered in a given area to both major and non-major students.

Note — the total number of credits which a student may earn in EDAD 489, 888, and 889 is limited to a maximum of 20 semester hours.

EDAD 498 Special Problems in Education. (1-3) Prerequisite, consent of instructor. Available only to mature students who have definite plans for individual study of approved problems.

EDAD 499 Workshops, Clinics, Institutes. (1-6) The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following type of educational enterprise may be scheduled under this course heading: workshops conducted by the college of education (or developed cooperatively with other colleges and universities) and not otherwise covered in the present course listing; clinical experiences in pupil-testing centers, reading clinics, speech therapy laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups.

Education Counseling and Personnel Services

EDCP 108 College Aims. (1) This course is primarily aimed at orienting new students toward the practice of efficient study techniques. It will be concerned with such topics as: how to study and develop higher level work skills; diagnosing and remedying skill disabilities; handling problem area which distracts students from their studies.

EDCP 410 Introduction to Counseling and Personnel Services. (3) Presents principles and procedures, and examines the function of counselors, psychologists in schools, school social workers, and other personnel service workers.

EDCP 411 Mental Hygiene. (3) The practical application of the principles of mental hygiene to classroom problems.

EDCP 413 Behavior Modification. (3) Knowledge and techniques of intervention in a variety of social situations, including contingency contracting and time out will be acquired.

EDCP 414 Principles of Behavior. (3) Development of student proficiency in analyzing complex patterns of behavior on the basis of empirical evidence.

EDCP 415 Behavior Mediation. (3) Prerequisite, EDCP 414. Basic principles of human behavior will be reviewed and application of these principles will be implemented under supervision.

EDCP 417 Group Dynamics and Leadership. (3) The nature and property of groups, interaction analysis, developmental phases, leadership dynamics and styles, roles of members and interpersonal communications. Two hours of lecture-discussion and two hours of laboratory per week; laboratory involves experimental based learning.

EDCP 420 Education and Racism. (3) Strategy development for counselors and educators to deal with problems of racism.

EDCP 460 Introduction to Rehabilitation Counseling. (3) Introductory course for majors in rehabilitation counseling, social work, psychology, or education who desire to work professionally with physically or emotionally handicapped persons.

EDCP 470 Introduction to Student Personnel. (3) Prerequisite, consent of instructor. A systematic analysis of research and theoretical literature on a variety of major problems in the organization and administration of student personnel services in higher education. Included will be discussion of such topics as the student personnel philosophy in education, counseling services, discipline, housing, student activities, financial aid, health, remedial services, etc.

EDCP 489 Field Experience in Counseling and Personnel Services. (1-4) Prerequisites, at least six semester hours in education at the University of Maryland plus such other prerequisites as may be set by the major area in which the experience is to be taken. Planned field experience may be provided for selected students who have had teaching experience and whose application for such field experience has been approved by the education faculty. Field experience is offered in a given area to both major and non-major students.

Note: The total number of credits which a student may earn in EDCP 489, 888, and 889 is limited to a maximum of 20 semester hours.

EDCP 498 Special Problems in Counseling and Personnel Services. (1-3) Prerequisite, consent of instructor. Available only to major students who have formal plans for individual study of approved problems.

EDCP 499 Workshops, Clinics, Institutes. (1-6) The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following type of educational enterprise may be scheduled under this course heading: workshops conducted by the department of counseling and personnel services (or developed cooperatively with other departments, colleges and universities) and not otherwise covered in the present course listing; clinical experiences in counseling and testing centers, reading clinics, speech therapy laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups.

Education, Early Childhood-Elementary

EDEL 288 Special Problems in Education. (1-6) Prerequisites, consent of education advisor. Available only to freshmen and sophomore students who have definite plans for individual study of approved problems relative to their preparation for teaching. Course cards must have the title of the problem and the name of the faculty member who has approved it.

EDEL 299 School Service Semester. (2) (Arranged for six hours each week). Students work as teacher aides in elementary schools with children under the guidance of school personnel. School service semester provides a basis for conceptual understanding of the teaching-learning process which enhances students' ability to relate to courses in professional education. Varied school experiences offer university students confidence in career selection while providing service to schools.

EDEL 304 Language Arts in Early Childhood Education. (2) Teaching of spelling, handwriting, oral and written expression, and creative expression.

EDEL 311 The Child and the Curriculum — Elementary. (2) Relationship of the elementary school curriculum to child growth and development. Recent trends in curriculum organization, the effect of environment on learning; readiness to learn, adapting curriculum content and methods to maturity levels of children.

EDEL 312 Art in the Elementary School. (2) Concerned with art methods and materials for elementary schools. Includes laboratory experiences with materials appropriate for elementary schools.

EDEL 315 Teaching in Nursery School and Kindergarten. (3) An overview of nursery school and kindergarten teaching designed for individuals without specific preparation for elementary school teaching or for individuals without recent teaching experience.

EDEL 316 Teaching in the Elementary School. (3) An overview of elementary school teaching for individuals without recent teaching experience.

EDEL 320 Curriculum and Instruction — Cooperative Nursery School. (3) Philosophy of early childhood education, observation of the developmental needs at various age levels, with emphasis upon the activities, materials and methods by which educational objectives are attained.

EDEL 321 Curriculum and Instruction — Early Childhood. (3)

EDEL 322 Curriculum and Instruction — Elementary. (3) Philosophy of elementary education, observation of the developmental needs at various age levels, with emphasis upon the activities, materials and methods by which educational objectives are attained.

EDEL 323 Foreign Language Methods in the Elementary School. (3) Registration limited and based upon approval of advisor. Methods and techniques for developmental approach to the teaching of modern foreign languages in elementary schools. Use of real development of oral-aural skills and understanding of young children in language development are stressed.

EDEL 324 Literature for Children and Young People. (3) Development of literary materials for children and young people. Timeless and ageless books, and outstanding examples of contemporary publishing. Evaluation of the contributions of individual authors and illustrators and children's book awards.

Student Teaching Courses

EDEL 330-337. Student teaching is a full time commitment. Consequently, interference with this commitment due to employment is not permitted. Transportation to the school(s) assigned for student teaching is the responsibility of each student. Student teachers in elementary, early childhood, special education and library science should reserve the week of registration for orientation in public schools. A doctor's certificate indicating freedom from communicable diseases and approval of the instructor required. Undergraduate credit only. No other courses may be taken during a full semester of student teaching. For 16 credits, full time for one semester is devoted to this work. For experienced teachers the time and credit may be reduced to not less than 8 credits.

EDEL 330 Student Teaching in the Nursery School. (3) Prerequisite, EDHD 300.

concurrent enrollment in EDEL 343, 344. The student will have the opportunity to work with children under the age of five years in one of a variety of settings such as nursery schools, day care centers, head start, hospitals or other community programs which involve teaching children under five years of age.

EDEL 331 Student Teaching in Dance. (6) Limited to dance education majors who have previously applied. Fulfills elementary teaching requirements in K-12 dance education program.

EDEL 332 Student Teaching in K-3. (6) Prerequisites, EDHD 300, concurrent enrollment in EDEL 340, 341, 342. This student teaching assignment is in a public school setting and involves work with children 5-9 years of age. It is expected that the student will have the major teaching contact at the kindergarten level and the remainder of the experience with children in one of the first three grades.

EDEL 333 Student Teaching in Elementary. (11) Prerequisites, EDEL 350, 351, 352, 353, 354.

EDEL 334 Student Teaching in Elementary — Special Education. (8) Limited to special education majors who have previously applied. Provides 8 weeks of full-time experience in the regular elementary classroom.

EDEL 335 Student Teaching in Music. (4-6)

EDEL 336 Student Teaching in Physical Education. (4-8)

EDEL 337 Student Teaching in Art. (4-8) Limited to art education majors who have previously applied. Fulfills elementary teaching requirements in K-12 art education program.

EDEL 340 Teaching Strategies for Young Children. (3) Prerequisites, EDHD 300, concurrent enrollment in EDEL 341, 342, 332. Intensive study of basic principles underlying learning opportunities for young children, planning daily programs, organizing the learning environment, developing the curriculum, clarifying values, guiding behavior, diagnosing and evaluating, and working with parents and other adults.

EDEL 341 The Young Child in His Social Environment. (3) Prerequisites, EDHD 300, concurrent enrollment in EDEL 340, 342, 332. The child's understanding of people, social roles, society and various cultures; his communicative skills and his ability to develop satisfying relationships with peers and adults. Related techniques, materials and resources included.

EDEL 342 The Teaching of Reading — Early Childhood. (3) Prerequisites, EDHD 300, concurrent enrollment in EDEL 340, 341, 332. Concerned with the fundamentals of developmental reading instruction, including reading readiness, use of experience records, procedures in using basal readers, the improvement of comprehension, teaching reading in all areas of the curriculum, uses of children's literature, the program in word analysis, and procedures for determining individual needs. Includes laboratory/field experiences.

EDEL 343 The Young Child and His Physical Environment. (3) Prerequisites, MATH 211, EDHD 300, and concurrent enrollment in EDEL 344, 330. Designed to help teachers of young children acquire developmental aspects, teaching skills, and background knowledge important to guiding the child in learning how to learn about his physical environment. The skills of quantification, observation, inference, space-time relationships, and classification will be emphasized.

EDEL 344 Creative Activities and Materials for the Young Child. (3) Prerequisites, EDHD 300, concurrent enrollment in EDEL 343, 330. Activities and experiences with materials; techniques and resources for using art media, music, songs and rhythms; play and creative dramatics.

EDEL 350 The Teaching of Language Arts — Elementary. (3) Prerequisites, EDEL 299, EDHD 300. Concerned with competencies in the knowledge of and the application of the language arts, including listening, oral communication, functional writing, creative writing, spelling, handwriting, and creative expression. A linguistic approach to grammar and language development is studied. Includes laboratory/field experiences.

EDEL 351 The Teaching of Mathematics — Elementary. (3) Prerequisites, MATH 211, EDEL 299, and EDHD 300. Emphasis on materials and procedures which help children sense arithmetical meanings and relationships. Helps teacher education students gain a better understanding of the number system and arithmetical processes. Includes laboratory/field experiences.

EDEL 352 The Teaching of Reading — Elementary. (3) Prerequisites, EDEL 299, EDHD 300. Concerned with the fundamentals of developmental reading instruction, including reading readiness, use of experience stories, procedures in using basal readers, the improvement of comprehension, teaching reading in all areas of the curriculum, uses of children's literature, the program in word analysis, and procedures for determining individual needs. Includes laboratory/field experiences.

EDEL 353 The Teaching of Science — Elementary. (3) Prerequisites, EDEL 299, EDHD 300. Designed to provide an overview of objectives, methods, materials and activities for teaching science in the elementary school. Considerable emphasis is placed on the 'doing' of science and on teaching strategies which help children learn the processes and concepts of science. Includes laboratory/field experiences.

EDEL 354 The Teaching of Social Science — Elementary. (3) Prerequisites, EDEL 299, EDHD 300. Consideration given to curriculum, organization and methods of teaching, evaluation of newer materials, and utilization of environmental resources. Includes laboratory/field experiences.

EDEL 401 Science in Early Childhood Education. (3) Designed primarily to help in-service teachers, nursery school through grade 3, to acquire general science understandings and to develop teaching materials for practical use in classrooms. Includes experiments, demonstrations, constructions, observations, field trips and use of audio-visual materials. The emphasis is on content and method related to science units in common use in nursery school through grade 3. Offered during summer sessions and in off-campus programs taught through University College. Ordinarily there is no field placement.

EDEL 402 Science in the Elementary School. (3) Designed primarily to help in-service teachers, grades 1-6, to acquire general science understandings and to develop teaching materials for practical use in classrooms. Includes experiments, demonstrations, constructions, observations, field trips and use of audio-visual materials. The emphasis is on content and methods related to science units in common use in grades 1-6. Offered during summer sessions and in off-campus programs taught through University College. Ordinarily there is no field placement.

EDEL 404 Language Arts in Early Childhood Education. (3) Teaching of spelling, handwriting, oral and written expression and creative expression. Designed primarily for in-service teachers, nursery school through grade 3. Offered during summer sessions and in off-campus programs taught through University College. Ordinarily, there is no field placement.

EDEL 405 Language Arts in the Elementary School. (3) Teaching of spelling, handwriting, oral and written expression and creative expression. Designed primarily for in-service teachers, grades 1-6. Offered during summer sessions and in off-campus programs taught through University College. Ordinarily there is no field placement.

EDEL 406 Social Studies in Early Childhood Education. (3) Consideration given to curriculum, organization and methods of teaching, evaluation of newer materials and utilization of environmental resources. Designed for in-service teachers, nursery school through grade 3. Offered during summer sessions and in off-campus programs taught through University College. Ordinarily there is no field placement.

EDEL 407 Social Studies in the Elementary School. (3) Consideration given to curriculum, organization and methods of teaching, evaluation of newer materials and utilization of environmental resources. Designed for in-service teachers, grades 1-6. Offered during summer sessions and in off-campus programs taught through University College. Ordinarily there is no field placement.

EDEL 410 The Child and the Curriculum — Early Childhood. (3) Relationship of the school curriculum, nursery school through grade 3, to child growth and development. Recent trends in curriculum organization; the effect of environment on learning, readiness to learn; and adapting curriculum content and methods to maturity levels of children. Designed for in-service teachers, nursery school through grade 3. Offered during summer sessions and in off-campus programs taught through University College. Ordinarily there is no field placement.

EDEL 411 The Child and The Curriculum — Elementary. (3) Relationship of the school curriculum, grades 1-6, to child growth and development. Recent trends in curriculum organization; the effect of environment on learning; readiness to learn; and adapting curriculum content and methods to maturity levels of children. Designed for in-service teachers, grades 1-6. Offered during summer sessions and in off-campus programs taught through University College. Ordinarily there is no field placement.

EDEL 412 Art in the Elementary School. (3) Concerned with art methods and materials for elementary schools. Includes laboratory experiences with materials appropriate for elementary schools.

EDEL 413 Mathematics in Early Childhood Education. (3) Prerequisite, MATH 210 or equivalent. Emphasis on materials and procedures which help pupils sense arithmetic meanings and relationships. Designed to help in-service teachers, nursery school through grade 3, gain a better understanding of the number systems and arithmetical processes. Offered during summer sessions and in off-campus programs taught through University College. Ordinarily there is no field placement.

EDEL 414 Mathematics in the Elementary School. (3) Prerequisite, MATH 210 or equivalent. Emphasis on materials and procedures which help pupils sense arithmetic meanings and relationships. Designed to help in-service teachers, grades 1-6, gain a better understanding of the number system and arithmetical processes. Offered during summer sessions and in off-campus programs taught through University College. Ordinarily there is no field placement.

EDEL 415 Diagnosis and Treatment of Learning Disabilities in Mathematics I. (3) Prerequisite, EDEL 314 or equivalent and approval of instructor. Diagnosis and treatment of disabilities in mathematics. Techniques and materials useful for working with children in both clinical and classroom settings. Case studies with children previously diagnosed as primarily corrective rather than severely disabled. Laboratory hours to be arranged.

EDEL 424 Literature for Children and Young People, Advanced. (3) Development of literary materials for children and young people. Timeless and ageless books, and outstanding examples of contemporary publishing. Evaluation of the contributions of individual authors and illustrators and children's book awards.

EDEL 425 The Teaching of Reading — Early Childhood. (3) Concerned with the fundamentals of developmental reading instruction, including reading readiness, use of experience stories, procedures in using basal readers, the improvement of comprehension, teaching reading in all areas of the curriculum, uses of children's literature, the program in word analysis, and procedures for determining individual needs. Designed for in-service teachers, nursery school through grade 3. Offered during summer sessions and in off-campus programs taught through University College. Ordinarily, there is no field placement.

EDEL 426 The Teaching of Reading — Elementary. (3) Concerned with the fundamentals of developmental reading instruction, including reading readiness, use of experience stories, procedures in using basal readers, the improvement of comprehension, teaching reading in all areas of the curriculum, uses of children's literature, the program in word analysis, and procedures for determining individual needs. Designed for in-service teachers, grades 1-6. Offered during summer sessions and in off-campus programs taught through University College. Ordinarily, there is no field placement.

EDEL 427 The Reading Process. (1-3) Prerequisite, consent of the department. A survey of the reading process to provide needed knowledge for graduate studies in reading. Students will be pretested prior to registration and take only those modules of the course identified as needed.

EDEL 430 Corrective-Remedial Reading Instruction. (3) Prerequisite, EDEL/EDSE 427 or equivalent, and consent of the department. For teachers, supervisors, and administrators who wish to identify and assist pupils with reading difficulties. Concerned with diagnostic techniques, instructional materials and teaching procedures useful in the regular classroom.

EDEL 431 Laboratory Practices in Reading. (3) Prerequisite, EDEL 430. A laboratory course in which each student has one or more pupils for analysis and instruction. At least one class meeting per week to diagnose individual cases and to plan instruction.

EDEL 488 Special Topics in Elementary Education. (1-3) Prerequisite, consent of instructor. Special treatment of current topics and issues in elementary education. Repeatable to maximum of 6 credits, provided content is different.

EDEL 489 Field Experience in Education. (1-4) Prerequisites, at least six semester hours in education at the University of Maryland plus such other prerequisites as may be set by the major area in which the experience is to be taken. Planned field experience may be provided for selected students who have had teaching experience and whose application for such field experience has been approved by the education faculty. Field experience is offered in a given area to both major and non-major students.

Note — the total number of credits which a student may earn in EDEL 489, 888, and 889 is limited to a maximum of 20 semester hours.

EDEL 498 Special Problems in Education. (1-3) Prerequisite, consent of instructor. Available only to mature students who have definite plans for individual study of approved problems.

EDEL 499 Workshops, Clinics, and Institutes. (1-6) The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following types of educational enterprise may be scheduled under this course heading: workshops conducted by the college of education (or developed cooperatively with other colleges and universities) and not otherwise covered in the present course listing; clinical experiences in pupil-testing centers, reading clinics, speech therapy laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups such as school superintendents, principals and supervisors.

EDEL 500 Education of the Young Child. (3) Prerequisites, a baccalaureate degree and consent of the department. An initial course for persons entering graduate study in early childhood education, to provide a foundation for further graduate study or a supplement to other areas. Intensive study of current education programs, teacher roles, and planning, staffing, and organizing for children's learning needs. Not applicable towards graduate degrees.

EDEL 501 Materials and Practices in Early Childhood Education. (3) Prerequisites, a baccalaureate degree and consent of the department. An overview of practices and media available for innovative approaches in early childhood programs, including diagnostic and prescriptive techniques. Not applicable toward graduate degrees.

Education, Human Development

EDHD 300 Human Development and Learning. (6) Open only to students approved for teacher education. Studies scientific facts that describe growth, development, and learning and the implications of these for the teacher and the school. A study of an individual child and a classroom participation experience are integral parts of the course and require a one-half day per week assignment in a public school as a teacher aide. Students are scheduled for field assignments in an elementary or high school according to the curriculum they are in. Each group is under the supervision of a faculty member with whom it meets every second week in a seminar session.

EDHD 306 A Study of Human Behavior. (3) This course is planned for and limited to students who are not enrolled in the college of education, and it does not satisfy the requirements of the professional teacher education programs. The course is designed to introduce students to the scientific principles (physical, social and psychological) which describe human behavior, development and adjustment at all maturity levels and to use these principles in the study of individual children and youth. Each student will observe, record, and analyze the behavior of an individual throughout the semester and must have one half-day a week for this purpose.

EDHD 319 Scientific Concepts in Human Development. (3) Concepts and issues in contemporary culture in relation to the development and learning of children and youth. Repeatable for a maximum of 6 credits if the topics differ.

EDHD 320 Human Development Through the Lifespan. (3) Central concepts related to parameters of human development, individual and social, which arise throughout the various stages of the lifespan. Continuity and change within the developing individual.

EDHD 330 Human Development and Societal Institutions. (3) Development of the individual in the context of his relationships with the formal and informal institutions of society. An examination of various aspects of development, from the broad perspective of the social sciences.

EDHD 350 Human Development Factors in Personal Development. (3) An exploration of personality dynamics including self-study experiences which contribute to the student's personal growth and self-insight. Designed for the preprofessional, with emphasis on factors which enhance optimal development in small group interaction.

EDHD 400 Introduction to Gerontology. (3) An overview of the processes of aging including physiological, sociological, and psychological aspects as an introduction to the field of gerontology. Analysis of physiological changes, cultural forces and self processes that have a bearing on life quality in the late years. Examination of community action in response to problems of the elderly. Direct field contact with programs for the elderly.

EDHD 411 Child Growth and Development. (3) Growth and development of the child from conception through the early childhood years, with emphasis on development sequences in physical, psychological and social areas. Implications for understanding and working with young children in the home, school, and other settings.

EDHD 413 Adolescent Development. (3) A study of the interplay of physical, cultural and self forces as they influence behavior, development, learning and adjustment during adolescence. Includes observation and case study. This course cannot be used to meet the psychological foundations requirements for teacher certification.

EDHD 416 Scientific Concepts in Human Development III. (3) Guided reading and observation of pupils throughout the school year. Emphasis on human development concepts relating to impact of family, school, society, and peer group on the student. Collection and analysis of data affecting learning and behavior. For in-service educators. (Not open to persons with credit in EDHD 402, 403.)

EDHD 417 Laboratory in Behavior Analysis III. (3) Prerequisite, EDHD 416. Guided reading and observation of pupils throughout the school year. Emphasis on analysis of intrinsic aspects of learning and behavior including cognitive processes, motivation, self-concept, attitudes, and values. For in-service educators. (Not open to persons with credit in EDHD 402, 403.)

EDHD 420 Study of Human Development and Learning in School Settings I. (2) Advanced study of human development and learning principles in the continuous study and evaluation of several different phases of the school program over an extended period of time.

EDHD 421 Study of Human Development and Learning in School Settings II. (2) Continuation of EDHD 420.

EDHD 422 Study of Human Development and Learning in School Settings III. (2) Continuation of EDHD 421.

EDHD 445 Guidance of Young Children. (3) Development of an appreciation and understanding of young children from different home and community backgrounds; study of individual and group problems.

EDHD 460 Educational Psychology. (3) Prerequisites, PSYC 100 or EDUC 300 or equivalent. Offers an examination of research and problems in educational psychology. Includes consideration of measurement and the significance of individual differences, learning, motivation and emotions, transfer of learning, intelligence, attitudes, problem solving, understanding, thinking, and communicating knowledge. The course is intended to provide an overview of educational psychology with an emphasis on learning processes. It may not be substituted for EDUC 300 by regularly matriculated students in the teacher education program.

EDHD 489 Field Experiences in Education. (1-4) Prerequisites, at least six semester hours in education at the University of Maryland plus such other prerequisites as may be set by the major area in which the experience is to be taken. Planned field experience may be provided for selected students who have had teaching experience and whose application for such field experience has been approved by the education faculty. Field experience is offered in a given area to both major and non-major students.

Note — The total number of credits which a student may earn in EDHD 489, 888, and 889 is limited to a maximum of 20 semester hours.

EDHD 498 Special Problems in Education. (1-3) Prerequisite, consent of instructor. Available only to mature students who have definite plans for individual study of approved problems.

EDHD 499 Workshops, Clinics, and Institutes. (1-6) The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following type of educational enterprise may be scheduled under this course heading: workshops conducted by the college of education (or developed cooperatively with other colleges and universities) and not otherwise covered in the present course listing; clinical experiences in pupil-testing centers, reading clinics, speech therapy laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups such as school superintendents, principals and supervisors.

Education, Industrial

EDIN 101 Mechanical Drawing I. (2) Four hours of laboratory per week. This course constitutes an introduction to orthographic multi-view and isometric projection. Emphasis is placed upon the visualization of an object when it is represented by a multi-view drawing and upon the making of multi-view drawings. The course carries through auxiliary views, sectional views, dimensioning, conventional representation and single stroke letters.

EDIN 102 Woodworking I. (3) Six hours of laboratory per week. The course is designed to give the student an orientation into the woodworking industry with regard to materials, products and processes while providing for skill development in the care and use of hand and power tools.

EDIN 106 Industrial Arts in the Elementary School I. (2) Four hours of laboratory per week. A course for pre-service and in-service elementary school teachers covering construction activities in a variety of media suitable for classroom use. The work is organized on the unit basis so that the construction aspect is supplemented by reading and other investigative procedures.

EDIN 110 Industrial Arts in the Elementary School II. (2) Prerequisite, EDIN 106. This is a continuation of EDIN 106. Four hours of laboratory per week. It provides the teacher with opportunities to develop further competence in construction activities. Some of the basic phenomena of industry are studied, particularly those which apply to the manufacture of common products, housing, transportation and communication.

EDIN 112 Shop Calculations. (3) Shop Calculations is designed to develop an understanding and working knowledge of the mathematical concepts related to the various aspects of industrial education. The course includes phases of algebra, geometry, trigonometry, and general mathematics as applied to shop and drawing activities.

EDIN 121 Mechanical Drawing II. (2) Four hours of laboratory per week. Prerequisite, EDIN 101. A course dealing with working drawings, machine design, pattern layouts, tracing and reproduction. Detail drawings followed by assemblies are presented.

EDIN 122 Woodworking II. (3) Six hours of laboratory per week. Prerequisite, EDIN 102, industrial arts teacher education majors. The course is designed to give the student a comprehensive knowledge of machine production with emphasis on safety, industrial processes and maintenance.

EDIN 124 Sheet Metal Work. (2) Four hours of laboratory per week. Articles are made from metal in its sheet form and involve the operations of cutting, shaping, soldering, riveting, wiring, folding, seaming, beading, burning, etc. The student is required to develop his own patterns inclusive of parallel line development, radial line development, and triangulation.

EDIN 127 Electricity-Electronics I. (3) Six hours of laboratory per week. An introductory course to electricity-electronics in general, dealing with electrical circuits and wiring, the measurement of electrical energy, the theory of motors and generators and an introduction to vacuum tubes, transistors and power supplies.

EDIN 133 Automotives I. (3) Six hours of laboratory per week. Automotives I is a study of the fundamentals of internal combustion engines as applied to transportation. A study of basic materials and methods used in the transportation industry is included.

EDIN 134 Graphic Arts I. (3) Six hours of laboratory per week. An introductory course involving experiences in letterpress and offset printing practices. This course includes typographical design, hand composition proof reading, stock preparation, off-set plate making, imposition, lock-up, press-work, linoleum block cutting, paper marbelizing, and bookbinding.

EDIN 184 Organized and Supervised Work Experiences. (3) (3 credits for each internship period, total: 6 credits.) This is a work experience sequence planned for students enrolled in the curriculum, 'Education for Industry'. The purpose is to provide the students with opportunities for first-hand experiences with business and industry. The student is responsible for obtaining his own employment with the coordinator advising him in regard to the job opportunities which have optimum learning value. The nature of the work experience desired is outlined at the outset of employment and then evaluations made by the student and the coordinator are based upon the planned experiences. The minimum time basis for each internship is 6 forty-hour weeks or 240 work hours. Any one period of internship must be served through continuous employment in a single establishment.

EDIN 201 Operational Drawing. (2) Four hours of laboratory per week. Prerequisite, EDIN 101 or equivalent. A comprehensive course designed to give students practice in the modern drafting methods of industry.

EDIN 210 Foundry. (1) Two hours of laboratory per week. Bench and floor molding and elementary core making. Theory and principles covering foundry materials, tools and appliances.

EDIN 223 Arc and Gas Welding. (1) Two hours of laboratory per week. A course designed to develop a functional knowledge of the principles and use of electric and acetylene welding. Practical work is carried on in the construction of various projects using welded joints. Instruction is given in the use and care of equipment, types of welded joints, methods of welding, importance of welding processes in industry, safety consideration, etc.

EDIN 226 General Metal Work. (3) Six hours of laboratory per week. This course provides experiences in constructing items from aluminum, brass, copper, pewter, and steel. The processes included are designing, layout, heat treating, forming, surface decorating, fastening, and assembling. The course also includes a study of the aluminum, copper, and steel industries in terms of their basic manufacturing processes.

EDIN 231 Mechanical Drawing. (2) Four hours of laboratory per week. Prerequisite, EDIN 101 and 121. A course dealing with the topics enumerated in EDIN 121 but on a more advanced basis. The reading of prints representative of a variety of industries is a part of this course.

EDIN 241 Architectural Drawing. (2) Four hours of laboratory per week. Prerequisite, EDIN 101 or equivalent. Practical experience is provided in the design and planning of houses and other buildings. Working drawings, specifications, and blueprints are featured.

EDIN 242 Woodworking III. (3) Six hours of laboratory per week. Prerequisite, EDIN 122. The course is designed to give the student a comprehensive knowledge of contemporary woodworking technology with emphasis on mass production techniques, industrial research, and materials tests.

EDIN 243 Automotives II. (3) Six hours of laboratory per week. Prerequisite, EDIN 133. This is an advanced course in transportation and power generation covering engines, fuel systems, ignition systems, and power trains.

EDIN 244 Graphic Arts II. (3) Six hours of laboratory per week. Prerequisite, EDIN 134. An advanced course designed to provide further experiences to letterpress and offset printing and to introduce other reproduction processes. Silk screen printing, dry print etching, mimeograph reproduction, and rubber stamp making are the new processes introduced in this course.

EDIN 247 Electricity-Electronics II. (3) Six hours of laboratory per week. Prerequisite, EDIN 127 or equivalent. An intermediate course designed to provide more extensive knowledge in electricity-electronics including the principles of the transmission and reception of radio waves, the applications of transistors and other semiconductors and an introduction to industrial electronics.

EDIN 262 Machine Shop Practice I. (3) Six hours of laboratory per week. Prerequisite, EDIN 101 or equivalent. Bench work, turning, planing, milling, and drilling. Related technical information.

EDIN 282 Machine Shop Practice II. (3) Four hours of laboratory per week. Prerequisite, EDIN 262 or equivalent. Advanced shop practicum in thread cutting, grinding, boring, reaming and gear cutting. Work-production methods are employed.

EDIN 288 Special Problems in Education. (1-6) Prerequisites, consent of education advisor. Available only to freshmen and sophomore students who have definite plans for individual study of approved problems relative to their preparation for teaching. Course cards must have the title of the problem and the name of the faculty member who has approved it.

EDIN 291 Introduction to Plastics Technology. (3) Lecture and laboratory. An overview of the plastics industry including properties of plastics, major polymers of the plastics industry and basic molding processes.

EDIN 305 General Shop. (3) Designed to meet needs in organizing and administering a secondary school shop. Students are rotated through skill and knowledge developing activities in a variety of shop areas.

EDIN 307 Electricity-Electronics III. (3) Six hours of laboratory per week. Prerequisite, EDIN 127 or equivalent. An advanced course designed to provide more extensive knowledge in electricity or electronics including the advanced theory and applications of semi-conductors and the principles of the storage and transmission of electronically coded information.

EDIN 311 Laboratory Practicum in Industrial Arts Education. (3) Six hours of laboratory per week. Prerequisite, 18 semester hours of shopwork and drawing. A course devoted to the development of instructional methods and the refinement of instructional methods pertinent to the teaching of industrial arts at the secondary school level.

EDIN 324 Organized and Supervised Work Experiences. (3) (3 credits for each internship period, total: 6 credits.) This is a work experience sequence planned for students enrolled in the curriculum, 'Education for Industry.' The purpose is to provide the students with opportunities for first-hand experiences with business and industry. The student is reponsible for obtaining his own employment with the coordinator advising him in regard to the job opportunities which have optimum learning value. The nature of the work experience desired is outlined at the outset of employment and then evaluations made by the student and the coordinator are based upon the planned experiences. The minimum time basis for each internship is six 40-hour weeks or 240 work hours. Any one period of internship must be served through continuous employment in a single establishment.

EDIN 340 Curriculum, Instruction, and Observation. (3) Major functions and specific contributions of industrial art education; its relation to the general objectives of the junior and senior high schools, selection and organization of subject matter in terms of modern practices and needs; methods of instruction; expected outcomes; measuring results; professional standards. Twenty periods of observation.

EDIN 347 Student Teaching in the Secondary Schools. (2-8) Admission to student teaching requires a doctor's certificate indicating freedom from communicable diseases; the consent of the coordinating instructor; one previous enrollment at the University of Maryland for at least one semester. Undergraduate credit only. Application forms for this course must be submitted to the appropriate advisor by the middle of the semester preceding the one in which an apprenticeship is desired. Students who register for this course serve as apprentice teachers in the schools to which they are assigned. For 8 credits, full time for one-half of the semester is devoted to this work. For experienced teachers who are planning to split student teaching assignment in elementary and secondary schools, the time and credit may be modified. Student teaching is a full-time commitment. Consequently, interference with this commitment due to employment is not permitted. Transportation to the school(s) assigned for student teaching is the responsibility of the student.

EDIN 350 Methods of Teaching. (3) (Offered at University College centers.) For vocational and occupational teachers of shop work and related subjects. The identification and analysis of factors essential to helping others learn; types of teaching situations and techniques; measuring results and grading student progress in shop and related technical subjects.

EDIN 357 Tests and Measurements. (3) The construction of objective tests for occupational and vocational subjects.

EDIN 391 Plastics Processing Fundamentals. (3) Lecture and laboratory. Prerequisite, EDIN 291 or permission of the department. Experience with plastics production equipment including an in-depth study of thermoplastic and thermosetting resins and their fabrication processes.

EDIN 399 Trade Competence. (1-20) An examination to determine and evaluate the trade competence of students pursuing a degree in the field of vocational-industrial education.

EDIN 409 Experimental Electricity and Electronics. (2)

EDIN 415 Research and Experimentation in Industrial Arts. (3) This is a laboratory-seminar course designed to develop persons capable of planning, directing and evaluating effective research and experimentation procedures with the materials, products and processes of industry.

EDIN 416 Industrial Hygiene. (3) Introduction to the concept of industrial hygiene and environmental health. Evaluation techniques, instrumentation for identification of problems; design parameters for achieving control over environmental epidemological and toxicological hazards.

EDIN 421 Industrial Arts in Special Education. (3) Four hours laboratory per week, one hour lecture. Prerequisite, EDSP 470 and 471 or consent of instructor. This course provides experiences of a technical and theoretical nature in industrial processes applicable for classroom use. Emphasis is placed on individual research in the specific area of one major interest in special education.

EDIN 425 Industrial Training in Industry I. (3) An overview of the function of industrial training, including types of programs, their organization, development, and evaluation.

EDIN 426 Industrial Training in Industry II. (3) Prerequisite, EDIN 425. Studies of training programs in a variety of industries, including plant program visitation, training program development, and analysis of industrial training research.

EDIN 443 Industrial Safety Education I. (2) This course deals briefly with the history and development of effective safety programs in modern industry and treats causes, effects and values of industrial safety education inclusive of fire prevention and hazard controls.

EDIN 444 Industrial Safety Education II. (2) In this course exemplary safety practices are studied through conference discussions, group demonstration, and organized plant visits to selected industrial situations. Methods of fire precautions and safety practices are emphasized. Evaluative criteria in safety programs are formulated.

EDIN 445 Systems Safety Analysis. (3) The development of systems safety, a review of probability concepts and the application of

systems technique to industrial safety problems. Hazard mode and effect, fault free analysis and human factors considerations.

EDIN 450 Training Aids Development. (3) Study of the aids in common use as to their source and application. Special emphasis is placed on principles to be observed in making aids useful to laboratory teachers. Actual construction and application of such devices will be required.

EDIN 457 Tests and Measurements. (3) The construction of objective tests for occupational and vocational subjects.

EDIN 460 Essentials of Design. (2) Two laboratory periods a week. Prerequisite, EDIN 101 and basic laboratory work. A study of the basic principles of design and practice in their application to the construction of laboratory projects.

EDIN 461 Principles of Vocational Guidance. (3) This course identifies and applies the underlying principles of guidance to the problems of educational and vocational adjustment of students.

EDIN 462 Occupational Analysis and Course Construction. (3) Provides a working knowledge of occupational and job analysis and applies the techniques in building and reorganizing courses of study for effective use in vocational and occupational schools.

EDIN 464 Laboratory Organization and Management. (3) This course covers the basic elements of organizing and managing an industrial education program including the selection of equipment and the arrangement of the shop.

EDIN 465 Modern Industry. (3) This course provides an overview of manufacturing industry in the American social, economic and culture pattern. Representative basic industries are studied from the viewpoints of personnel and management organization, industrial relations, production procedures, distribution of products, and the like.

EDIN 466 Educational Foundations of Industrial Arts. (3) A study of the factors which place industrial arts education in any well-rounded program of general education.

EDIN 467 Problems in Occupational Education. (3) The purpose of this course is to secure, assemble, organize, and interpret data relative to the scope, character and effectiveness of occupational education.

EDIN 470 Numerical Control in Manufacturing. (3) The historical development of numerical control (n/c) in manufacturing, recent industrial trends in n/c, and a variety of n/c equipment and support services. N/c machine operations; machine motions, positioning control systems, n/c tapes and their preparation, manual and computer assisted (APT III) part programming. Experience in product design, part programming, and product machining.

EDIN 471 History and Principles of Vocational Education. (3) An overview of the development of vocational education from primitive times to the present with special emphasis given to the vocational education movement with the American program of public education.

EDIN 475 Recent Technological Developments in Products and Processes. (3) This course is designed to give the student an understanding of recent technological developments as they pertain to the products and processes of industry. The nature of the newer products and processes is studied as well as their effect upon modern industry and/or society.

EDIN 487 Field Experience in Education. (1-4) Prerequisites, at least six semester hours in education at the University of Maryland plus such other prerequisites as may be set by the major area in which the experience is to be taken. Planned field experience may be provided for selected students who have had teaching experience and whose application for such field experience has been approved by the education faculty. Field experience is offered in a given area to both major and non-major students.

Note — The total number of credits which a student may earn in EDIN 487, 888, and 889 is limited to a maximum of 20 semester hours.

EDIN 488 Special Problems in Education. (1-3) Prerequisite, consent of instructor. Available only to mature students who have definite plans for individual study of approved problems.

EDIN 491 Plastics Design and Equipment Selection. (3) Lecture and laboratory. Prerequisite, EDIN 391 or permission of the department. Includes experience with material selection, product design, mold design, auxiliary equipment and fixtures.

EDIN 499 Workshops, Clinics, and Institutes. (1-6) The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following type of educational enterprise may be scheduled under this course heading: workshops conducted by the college of education (or developed cooperatively with other colleges and universities) and not otherwise covered in the present course listing; clinical experiences in pupil-testing centers, reading clinics, speech therapy laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups such as school superintendents, principals and supervisors.

Education, Measurement and Statistics

EDMS 410 Principles of Testing and Evaluation. (3) Basic principles including the steps in the specification of instructional objectives and subsequent development of teacher-made tests; problems in the use and interpretation of achievement and aptitude tests; introduction to the development and use of non-testing evaluation procedures; basic considerations in the assignment of marks and grades; introduction to computer technology as applied to measurement.

EDMS 446 Quantitative Research Methods I. (3) An introduction to research design principles and the scientific method as applied to behavioral phenomena. Instrumentation procedures including the planning and construction of simple data collection instruments and their analysis, and assessment of the reliability and validity of such instruments. Statistical procedures appropriate to the analysis of data from simple research designs. Laboratory experiences in instrumentation and research design are emphasized.

EDMS 451 Introduction to Educational Statistics. (3) Designed as a first course in statistics for students in education. Emphasis is upon educational applications of descriptive statistics, including measures of central tendency, variability and association. Also included are inferential statistics through one-way anova.

EDMS 465 Algorithmic Methods in Educational Research. (3) Introduction to the use of the computer as a tool in educational research. Instruction in a basic scientific computer source language as well as practical experience in program writing for solving statistical and educational research problems.

EDMS 489 Field Experience in Measurement and Statistics. (1-3) Prerequisites, at least six credits in education courses at the University of Maryland, plus such other prerequisites as may be set by the major area in which the experience is to be taken. Planned field experience for education majors. Repeatable for credit to a maximum of six credits.

EDMS 498 Special Problems in Measurement and Statistics. (1-3) Prerequisite, consent of instructor. Available only to education majors who have formal plans for individual study of approved problems. Repeatable for credit to a maximum of six credits.

Education, Secondary

EDSE 100 Principles of Typewriting. (2) Five periods per week. Prerequisite, consent of instructor. The goal of this course is the attainment of the ability to operate the typewriter continuously with reasonable speed and accuracy by the "touch."

EDSE 101 Intermediate Typewriting. (2) Five periods per week. Prerequisite, minimum grade of C in EDSE 100 or consent of instructor. Drills for improving speed and accuracy and an introduction to office production typewriting. This course must be completed prior to enrollment in EDSE 204.

EDSE 102 Principles of Shorthand I. (3) Prerequisite, consent of instructor. Five periods per week. Development of the theory and principles of Gregg shorthand.

EDSE 103 Principles of Shorthand II. (3) Prerequisite, consent of instructor. Five periods per week. Develops mastery of dictation.

EDSE 151 Bases for Home Economics. (1) Exploration of decisions about concept priorities represented in public school home economics curricula based on the needs of society, the individual, and the structure of the home economics program.

EDSE 200 Office Typewriting Problems. (2) Five periods per week. Prerequisite, minimum grade of C in EDSE 101 or consent of instructor. A course to develop the higher degree of accuracy and speed possible and to teach the advanced techniques of typewriting and special emphasis on production.

EDSE 201 Survey of Office Machines. (2) Prerequisite, sophomore standing. The various types of office business machines are surveyed, their capacities and special functions compared. Skill is developed through actual use and demonstration of such machines as accounting, duplicating, dictating and transcribing, adding and calculating, and other functional types of machines and equipment. The course is designed also to give special training in the handling of practical business problems with machine application.

EDSE 204 Advanced Shorthand and Transcription. (3) Prerequisite, minimum

grade of C in EDSE 101 and consent of instructor. Seven periods per week. Emphasis is placed on vocabulary development and new matter dictation for sustained speed at the highest level possible under varying conditions. Transcription is under timed conditions with emphasis on production involving quantity and quality of finished product.

EDSE 205 Problems in Transcription. (3) Prerequisite, minimum grade of C in EDSE 204 or consent of instructor. Seven periods per week. A systematic development of recording skills under special and office-style dictation and transcription conditions with particular emphasis on transcriptional problems.

EDSE 210 Teaching Roles in Home Economics. (1) Weekly two-hour observation in urban area schools, integrated with home economics, methodologies for teaching secondary home economics, and roles of the secondary home economics teacher.

EDSE 260 Introduction to Art Education. (3) An introductory lecture-laboratory course designed to introduce the student to the field of art education as a profession. Each student will spend 4-6 weeks as a teacher aid in a school setting. Required as a prerequisite for admission into the remainder of the professional art education program. (The students need to leave Tuesday and Thursday p.m. free of other classes.)

EDSE 288 Special Problems in Education. (1-6) Prerequisites, consent of education advisor. Available only to freshmen and sophomore students who have definite plans for individual study of approved problems relative to their preparation for teaching.

EDSE 300 Techniques of Teaching Office Skills. (3) First semester. An examination and evaluation of the aims, methods, and course contents of each of the office skill subjects offered in high school curriculum.

EDSE 304 Administrative Secretarial Procedures. (3) Prerequisite, EDSE 204 and 205 or consent of the instructor. The nature of office work, the secretary's function in communication, inter-company and public relations, handling records, supplies and equipment; and in direction of the office forms and procedures in relation to correspondence, mailing, receiving callers, telephoning, handling conferences, and securing business information. Business etiquette and ethics.

EDSE 305 Secretarial Office Practice. (3) Six periods per week. Prerequisite, senior standing and completion of EDSE 304. The purpose of this course is to give laboratory and office experience to senior students. A minimum of 90 hours of office experience under supervision is required. In addition, each student will prepare a written report of an original problem previously approved.

EDSE 330 Principles and Methods of Secondary Education. (2-3) This course is concerned with the principles and methods of teaching in junior and senior high schools. Instructional problems common to all of the subject fields are considered in relation to the needs and interests of youth, and urgent social problems of today, and the central values to which our society is committed.

EDSE 331 Introduction to Educational Media Services. (3) An overview of the library profession. Development of public, academic, special and school services. History of books and libraries. The library as a social institution. The impact of communication media on society. Philosophy of librarianship. Professional standards, organizations and publications.

Curriculum, Instruction and Observation Courses.

EDSE 340-354 Offered in separate courses for the various subject matter areas. The objectives, selection and organization of subject matter, appropriate methods, lesson plans, textbooks and other instructional materials, measurement, and other topics pertinent to the particular subject matter area are treated. Twenty periods of observation. Students must reserve all day each Tuesday for observation in public schools.

EDSE 340 Curriculum, Instruction, and Observation — Art. (3)

EDSE 341 Curriculum, Instruction, and Observation — Business Education. (3)

EDSE 342 Curriculum, Instruction, and Observation — Dance. (3)

EDSE 343 Curriculum, Instruction, and Observation — Distributive Education. (3)

EDSE 344 Curriculum, Instruction, and Observation — English. (3)

EDSE 345 Curriculum, Instruction, and Observation — Foreign Language. (3)

EDSE 346 Curriculum, Instruction, and Observation — Geography. (3)

EDSE 347 Curriculum, Instruction, and Observation — Home Economics. (3)

EDSE 350 Curriculum, Instruction, and Observation — Mathematics. (3)

EDSE 351 Curriculum, Instruction, and Observation — Music. (3)

EDSE 352 Curriculum, Instruction, and Observation — Science. (3)

EDSE 353 Curriculum, Instruction, and Observation — Social Studies. (3)

EDSE 354 Curriculum, Instruction, and Observation — Speech. (3)

EDSE 355 Student Teaching in School Media Centers — Secondary. (4) Prerequisites, EDHD 300, EDSE 387, 381, 382, 383, 384, or consent of instructor. Supervised internship experience in secondary school media centers. Participation at a professional level in the management and operation of an on-going media program.

Student Teaching Courses

EDSE 360-377 Admission to student teaching requires a doctor's certificate indicating freedom from communicable diseases; the consent of the instructor in the appropriate area; previous enrollment at the University of Maryland for at least one semester. Undergraduate credit only. Offered in separate courses for the various areas. Application forms for this course must be submitted to the appropriate advisor by the middle of the semester preceding the one in which an assignment is desired. Students who register for this course serve as apprentice teachers in the schools to which they are assigned. For 8 credits, full time for one-half of the semester is devoted to this work. For experienced teachers and students in physical education, music education, and library science education who are planning to split student teaching assignment in elementary and secondary schools, the time and credit may be modified. Student teaching is a full-time commitment. Consequently, interference with this commitment due to employment is not permitted. Transportation to the school(s) assigned for student teaching is the responsibility of the student.

EDSE 360 Student Teaching in Secondary Schools — Art. (2-8)

EDSE 361 Student Teaching in Secondary Schools — Business Education. (2-8)

EDSE 362 Student Teaching in Secondary Schools — Dance. (2-8)

EDSE 363 Student Teaching in Secondary Schools — Distributive Education. (2-8)

EDSE 364 Student Teaching in Secondary Schools — English. (2-8)

EDSE 365 Student Teaching in Secondary Schools — Foreign Languages. (2-8)

EDSE 366 Student Teaching in Secondary Schools — Geography. (2-8)

EDSE 367 Student Teaching in Secondary Schools — Health. (2-8)

EDSE 370 Student Teaching in Secondary Schools — Home Economics. (2-8)

EDSE 372 Student Teaching in Secondary Schools — Mathematics. (2-8)

EDSE 373 Student Teaching in Secondary Schools — Music. (2-8)

EDSE 374 Student Teaching in Secondary Schools — Physical Education. (2-8)

EDSE 375 Student Teaching in Secondary Schools — Science. (2-8)

EDSE 376 Student Teaching in Secondary Schools — Social Studies. (2-8)

EDSE 377 Student Teaching in Secondary Schools — Speech. (2-8)

EDSE 380 Field Experience in Analysis of Child Development Laboratories. (1) Observation and participation in a secondary school child development laboratory bi-weekly, alternated with bi-weekly seminars. Integration of child development theories with laboratory experiences. Enrollment in FMCD 332 or EDHD 411, and 425 either prerequisite or concurrent.

EDSE 381 Basic Reference and Information Sources. (3) An introductory course in the nature of reference/information service and the sources, and technology tools essential to the reference process. Selection, evaluation and utilization of all types of reference tools for school media centers.

EDSE 382 Cataloging and Classification of Materials. (3) Introduction to the principles and practice of media and information retrieval system organization and construction, including classification schemes; cataloging codes; subject heading lists; and file control.

EDSE 383 Library Materials for Children and Youth. (3) Study of literature and media for children and youth, including fiction and information materials: books, periodicals, television, filmstrips, films, microfilms, records, pamphlets. Introduction to reading, viewing and listening guidance techniques.

EDSE 384 Media Center Administration. (3) The management and operation of instructional media centers, including staffing; material and equipment acquisition, dissemination and control; program planning and evaluation; and facilities design.

EDSE 385 Student Teaching in School Media Centers — Elementary. (4) Prerequisites, EDHD 300, EDSE 387, 381, 382, 383, 384, or consent of instructor. Supervised internship experience in elementary and middle school media centers. Participation at a professional

level in the management and operation of an on-going media program.

EDSE 402 Methods and Materials in Teaching Bookkeeping and Related Subjects. (3) Important problems and procedures in the mastery of bookkeeping and related office knowledge and the skills including a consideration of materials and teaching procedures.

EDSE 403 Problems in Teaching Office Skills. (3) Problems in development of occupational competency, achievement tests, standards of achievement, instructional materials, transcription, and the integration of office skills.

EDSE 404 Basic Business Education in the Secondary Schools. (3) Includes consideration of course objectives; subject matter selection; and methods of organization and presenting business principles, knowledge and practices.

EDSE 415 Financial and Economic Education I. (3) Problems of teaching courses in personal finance and economics in the public schools, including materials and resources.

EDSE 416 Financial and Economic Education II. (3) Continuation of EDSE 415.

EDSE 420 Organization and Coordination of Distributive Education Programs. (3) This course deals specifically with such areas as the organization of a cooperative distributive education program; the development of an effective cooperative relationship between coordinator and training sponsor; the selection, orientation, and training of sponors; analysis of training opportunities, reports and records; the evaluation and selection of students for part-time cooperative work assignments; and the evaluation of the program.

EDSE 421 Methods and Materials in Distributive Education. (3) This course covers basic methods and materials needed to teach the preparatory classroom related instruction of a one or two year distributive education program. It deals specifically with the organization of special supplementary materials for individual and group instruction-youth club programs, organization and administration.

EDSE 423 Field Experiences in Vocational Work. (3)
A — Home Economics Education
B — Business Education
C — Distributive Education

Supervised work experience in an occupation related to vocational education. Application of theory to work situations as a basis for teaching in vocational education programs. By individual arrangement with advisor.

EDSE 425 Curriculum Development in Home Economics. (3) An analysis of curriculum development including the tools for planning, managing, and evaluating the teaching/learning environment of conceptual curriculum design. Includes a field experience.

EDSE 426 Evaluation of Home Economics. (3) The meaning and function of evaluation in education; the development of a plan for evaluating a homemaking program with emphasis upon types of evaluation devices, their construction and use.

EDSE 427 The Reading Process. (1-3) Prerequisite, consent of the department. A survey of the reading process to provide needed knowledge for graduate studies in reading. Students will be pretested prior to registration and take only those modules of the course identified as needed.

EDSE 430 Corrective-Remedial Reading Instruction. (3) Prerequisite, EDEL/EDSE 427 or equivalent, and consent of the department. For teachers, supervisors, and administrators who wish to identify and assist pupils with reading difficulties. Concerned with diagnostic techniques, instructional materials and teaching procedures useful in the regular classroom.

EDSE 431 Laboratory Practices in Reading. (2-4) Prerequisite, EDSE 430. A laboratory course in which each student has one or more pupils for analysis and instruction. At least one class meeting per week to diagnose individual cases and to plan instruction.

EDSE 432 The Junior High School. (2-3) A general overview of the junior high school. Purposes, functions and characteristics of this school unit; a study of its population, organization, program of studies, methods, staff, and other topics, together with their implications for prospective teachers.

EDSE 440 Methods of Teaching English in Secondary Schools. (3)

EDSE 441 Practicum in Art Education. (3) One two-hour lecture discussion period and two, two-hour laboratory sessions per week. Instruction will be aimed at reviewing experiences in a chosen medium of art and assembling a workable procedure to present the content to secondary school students. The course will provide a studio setting in which the student will assemble materials for an in-depth study of the practical work involved and attempt to develop a total concept in a particular area of art.

EDSE 442 Teaching the Audio-Lingual Skills in Foreign Languages. (3)

EDSE 444 Methods of Teaching Mathematics in Secondary Schools. (3)

EDSE 446 Methods of Teaching Science in Secondary Schools. (3)

EDSE 447 Methods of Teaching Social Studies in Secondary Schools. (2-3)

EDSE 450 Speech Methods and Resources in Secondary Schools. (3)

EDSE 453 The Teaching of Reading in the Secondary School. (3)

EDSE 460 Environmental Education. (3) Two lecture-discussion periods and one three-hour laboratory-field experience session per week. An interdisciplinary course covering the literature, techniques and strategies of environmental education. Emphasis is upon the study of environmental education programs and the development of a specific program which is designed to implement the solution of an environmental problem. The laboratory-field experience is provided as a model for future activities of students. Open to any student who wishes to become actively involved in the process of environmental education program development.

EDSE 470 Teaching of Art Criticism in Public Schools. (3) Introduction to various alternative theories of aesthetics as related to the teaching of art.

EDSE 488 Special Topics in Secondary Education. (1-3) Repeatable for a maximum of 6 hours.

EDSE 489 Field Experience in Education. (1-4) Prerequisite, at least six semester hours in education at the University of Maryland plus such other prerequisites as may be set by the secondary education department. Planned field experience may be provided for selected students who have had teaching experience and whose application for such field experience has been approved by the secondary education faculty. Field experience is offered in a given area to both major and non-major students.

Note — The total number of credits which a student may earn in EDSE 489, 888, and 889 is limited to a maximum of 20 semester hours.

EDSE 498 Special Problems in Education. (1-3) Prerequisite, consent of instructor. Available only to mature students who have definite plans for individual study of approved problems.

EDSE 499 Workshops, Clinics, and Institutes. (1-6) The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following type of educational enterprise may be scheduled under this course heading: workshops conducted by the college of education (or developed cooperatively with other colleges and universities) and not otherwise covered in the present course listing; clinical experiences in pupil-testing centers, reading clinics, speech therapy laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups such as school superintendents, principals and supervisors.

Education, Social Foundations

EDSF 288 Special Problems in Education. (1-6) Prerequisites, consent of education advisor. Available only to freshmen and sophomore students who have definite plans for individual study of approved problems relative to their preparation for teaching.

EDSF 301 Foundations of Education. (3) Prerequisites, EDUC 300, completion of at least 90 hours and approval for admission to teacher education. Historical, social, cultural, and philosophical foundations of American education. Considers education as a profession, and the organizational structure, operation and function of modern school systems. Comparative education and contemporary issues are included.

EDSF 409 Special Topics in the Social Foundations of Education. (1-3) Repeatable to a maximum of nine hours. An intensive examination of current problems and issues in the formation of educational policies. May be repeated for credit when the topics dealt with are different.

EDSF 410 History of Education in Western Civilization. (3) Educational institutions through the ancient, medieval and early modern periods in western civilization, as seen against a background of socio-economic development.

EDSF 411 History of Education in the United States. (3) A study of the origins and development of the chief features of the present system of education in the United States.

EDSF 420 Philosophy of Education. (3) A study of the great educational philosophers and systems of thought affecting the development of modern education.

EDSF 421 Logic of Teaching. (3) An analysis of the structure of basic subject matters in the

curriculum and of the standard logical moves in teaching.

EDSF 430 Educational Sociology. (3) Deals with data of the social sciences which are germane to the work of teachers. Implications of democratic ideology for educational endeavor, educational tasks imposed by changes in population and technological trends, the welfare status of pupils, the socio-economic attitudes of individuals who control the schools, and other elements of community background.

EDSF 489 Field Experience in Education. (1-4) Prerequisites, at least six semester hours in education at the University of Maryland plus such other prerequisites as may be set by the major area in which the experience is to be taken. Planned field experience may be provided for selected students who have had teaching experience and whose application for such field experience has been approved by the education faculty. Field experience is offered in a given area to both major and non-major students.

Note — The total number of credits which a student may earn in EDSF 489, 888, and 889 is limited to a maximum of 20 semester hours.

EDSF 498 Special Problems in Education. (1-3) Prerequisite, consent of instructor. Available only to mature students who have definite plans for individual study of approved problems.

EDSF 499 Workshops, Clinics, and Institutes. (1-6) The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following type of educational enterprise may be scheduled under this course heading: workshops conducted by the college of education (or developed cooperatively with other colleges and universities) and not otherwise covered in the present course listing; clinical experiences in pupil-testing centers, reading clinics, speech therapy laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups such as school superintendents, principals and supervisors.

Education, Special

EDSP 288 Special Problems in Education. (1-6) Prerequisite, consent of special education advisor. Open only to special education majors. Available only to freshmen and sophomore students who have definite plans for individual study of approved problems relative to their preparation for teaching. Such study will usually take the form of a field experience as a teacher's aide in a special education program for one-half day a week.

EDSP 349 Student Teaching of Exceptional Children. (8) A doctor's certificate indicating freedom from communicable diseases and approval of department required. Undergraduate credit only. Students in special education enroll in 8 credits of EDEL 333 for 8 weeks during the same semester. No other courses may be taken during a full semester of student teaching.

EDSP 470 Introduction to Special Education. (3) Prerequisite, EDSP 288. Designed to give an understanding of the needs of all types of exceptional children. Stressing preventive and remedial measures.

EDSP 471 Characteristics of Exceptional Children — Mentally Retarded. (3) Prerequisite, EDSP 470 or equivalent. Studies the diagnosis, etiology, physical, social and emotional characteristics of exceptional children.

EDSP 472 Education of Exceptional Children — Mentally Retarded. (3) Prerequisite, EDSP 471 or equivalent. Offers practical and specific methods of teaching exceptional children. Selected observation of actual teaching may be arranged.

EDSP 473 Curriculum for Exceptional Children — Mentally Retarded. (3) Prerequisite, EDSP 471 or equivalent. Examines the principles and objectives guiding curriculum for exceptional children; gives experience in developing curriculum; studies various curricula currently in use.

EDSP 475 Education of the Slow Learner. (3) Studies the characteristics of the slow learner and those educational practices which are appropriate for the child who is functioning as a slow learner.

EDSP 481 Characteristics of Exceptional Children — Gifted. (3) Prerequisite, EDSP 470 or equivalent. Studies the diagnosis, etiology, physical, social, and emotional characteristics of exceptional children.

EDSP 482 Education of Exceptional Children — Gifted. (3) Prerequisite, EDSP 481 or equivalent. Offers practical and specific methods of teaching exceptional children. Selected observation of actual teaching may be arranged.

EDSP 483 Curriculum for Exceptional Children — Gifted. (3) Prerequisite, EDSP 481 or equivalent. Examines the principles and objectives guiding current curriculum for exceptional children; gives experience in developing curriculum; studies various curricula currently in use.

EDSP 489 Field Experience in Special Education. (1-4) Prerequisites, at least six semester hours in special education at the University of Maryland plus such other prerequisites as may be set by the special education department. Planned field experience may be provided for selected students who have had teaching experience and whose application for such field experience has been approved by the special education faculty.

Note — The total number of credits which a student may earn in EDSP 489, 888, and 889 is limited to a maximum of 20 semester hours.

EDSP 491 Characteristics of Exceptional Children — Perceptual Learning Problems. (3) Prerequisite, EDSP 470 or equivalent. Studies the diagnosis, etiology, physical, social, and emotional characteristics of exceptional children.

EDSP 492 Education of Exceptional Children — Perceptual Learning Problems. (3) Prerequisite, EDSP 491 or equivalent. Offers practical and specific methods of teaching exceptional children. Selected observation of actual teaching may be arranged.

EDSP 493 Curriculum for Exceptional Children — Perceptual Learning Problems. (3) Prerequisite, EDSP 492 or equivalent. Examines the principles and objectives guiding curriculum for exceptional children; gives experience in developing curriculum; studies various curricula currently in use.

EDSP 498 Special Problems in Special Education. (1-3) Prerequisite, consent of instructor. Available only to mature students who have definite plans for individual study of approved problems.

EDSP 499 Workshops, Clinics, and Institutes in Special Education. (1-6) The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following type of educational enterprise may be scheduled under this course heading: workshops conducted by the special education department (or developed cooperatively with other departments, colleges and universities) and not otherwise covered in the present course listing; laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups such as school superintendents, principals and supervisors.

Engineering, Aerospace

ENAE 201 Introduction to Aerospace Engineering I. (2) Prerequisite, ENES 110. Characteristics of the atmosphere, lifting surfaces, drag, propulsion systems, and aircraft control.

ENAE 202 Introduction to Aerospace Engineering II. (2) Prerequisite, ENAE 201. Guidance, structures, and performance of aerospace vehicles, weather, safety, and flight simulation. The aerospace industry and aerospace engineering as a profession.

ENAE 203 Technical Writing. (1) Corequisite, ENAE 201. Technical writing as a means of effective professional communication. Practice in the writing process with attention to grammar and style. Tables, graphs, and figures.

ENAE 305 Aerospace Laboratory I. (3) Prerequisite, ENEE 300. Pre- or corequisites, ENAE 345, ENAE 451, and ENAE 371. Measurement philosophy, data analysis, error assessment, sensing devices, optical methods, material tests; flow visualization techniques, manometry, dynamic response of measurement systems. Application of instrumentation in aerospace technology.

ENAE 345 Flight Dynamics. (3) Prerequisites, ENES 221 and MATH 246. Kinematics and concept of system state. Dynamic principles applied to particles, discrete mass and continuously distributed mass systems, Lagrangian dynamics, dynamic stability of systems, applications to dynamics of aerospace vehicles and vehicle components.

ENAE 355 Aircraft Vibrations. (3) Prerequisite, ENAE 345 or equivalent. Free and forced vibration of single and multiple degree of freedom systems.

ENAE 371 Aerodynamics I. (3) Prerequisites, ENAE 202, PHYS 262, MATH 241 and concurrent registration in MATH 246. Basic fluid mechanics and aerodynamic theory.

ENAE 401 Aerospace Laboratory II. (2) Prerequisites, ENAE 305 and ENAE 345. Corequisites, ENAE 452 and ENAE 471. Application of fundamental measurement techniques to experiments in aerospace engineering, structural, aerodynamic, and propulsion tests, correlation of theory with experimental results.

ENAE 402 Aerospace Laboratory III. (1) Prerequisites, ENAE 305 and ENAE 345. Corequisites: ENAE 452, ENAE 471, and ENAE 475. Application of fundamental measurement techniques to experiments in aerospace engineering, structural, aerodynamic, flight

simulation, and heat transfer tests. Correlation of theory with experimental results.

ENAE 411 Aircraft Design. (3) Prerequisites, ENAE 345, ENAE 451, and ENAE 371. Theory, background and methods of airplane design, subsonic and supersonic.

ENAE 412 Design of Aerospace Vehicles. (3) Prerequisites, ENAE 345 and ENAE 371. Theory, background and methods of space vehicle design for manned orbital vehicles, manned lunar and planetary landing systems.

ENAE 415 Computer-Aided Structural Design Analysis. (3) Prerequisite, ENAE 452 or consent of instructor. Introduction to structural design concepts and analysis techniques. Introduction to computer software for structural analysis which is utilized to verify exact solutions and perform parametric design studies of aerospace structures. Not open to students who have earned credit in ENAE 431.

ENAE 445 Stability and Control of Aerospace Vehicles. (3) Prerequisite, ENAE 345 and ENAE 371. Stability, control and miscellaneous topics in dynamics.

ENAE 451 Flight Structures I: Introduction to Solid Mechanics. (4) Prerequisite, ENES 220. An introduction to the analysis of aircraft structural members. Introduction to theory of elasticity, mechanical behavior of materials, thermal effects, finite-difference approximations, virtual work, variational and energy principles for static systems.

ENAE 452 Flight Structures II: Structural Elements. (3) Prerequisite, ENAE 451. Application of variational and energy principles to analysis of elastic bodies, stresses and deflections of beams including effects of non-principal axes, non-homogeneity, and gradients, differential equations of beams, bars, and cables. Stresses and deflections of torsional members, stresses due to shear. Deflection analysis of structures.

ENAE 453 Matrix Methods in Computational Mechanics. (3) Prerequisite, ENAE 452 or consent of instructor. Introduction to the concepts of computational analysis of continuous media by use of matrix methods. Foundation for use of finite elements in any field of continuum mechanics, with emphasis on the use of the displacement method to solve thermal and structural problems.

ENAE 457 Flight Structures III. (3) Prerequisite, ENAE 452 or equivalent. An advanced undergraduate course dealing with the theory and analysis of the structures of flight vehicles. Stresses due to shear, indeterminate structures, plate theory, buckling and failure of columns and plates.

ENAE 461 Flight Propulsion I. (3) Prerequisites, ENME 216 and ENAE 471. Operating principles of piston, turbojet, turboprop, ramjet and rocket engines, thermodynamic cycle analysis and engine performance, aerothermochemistry of combustion, fuels, and propellants.

ENAE 462 Flight Propulsion II. (3) Prerequisite, ENAE 461. Advanced and current topics in flight propulsion.

ENAE 471 Aerodynamics II. (3) Prerequisite, ENAE 371 and ENME 216. Elements of compressible flow with applications to aerospace engineering problems.

ENAE 472 Aerodynamics III. (3) Three lectures per week. Prerequisite, ENAE 371. Elective for seniors in aerospace engineering. Theory of the flow of an incompressible fluid.

ENAE 473 Aerodynamics of High-Speed Flight. (3) Prerequisite, ENAE 372 or equivalent. An advanced course dealing with aerodynamic problems of flight at supersonic and hypersonic velocities. Unified hypersonic and supersonic small disturbance theories, real gas effects, aerodynamic heating and mass transfer with applications to hypersonic flight and re-entry.

ENAE 475 Viscous Flow and Aerodynamic Heating. (3) Prerequisites, ENAE 371, ENAE 471, and ENME 216. Fundamental aspects of viscous flow, Navier-Stokes equations, similarity, boundary layer equations; laminar, transitional and turbulent incompressible flows on airfoils, thermal boundary layers and convective heat transfer; conduction through solids, introduction to radiative heat transfer.

ENAE 488 Topics in Aerospace Engineering. (1-4) Technical elective taken with the permission of the student's advisor and instructor. Lecture and conference courses designed to extend the student's understanding of aerospace engineering. Current topics are emphasized.

ENAE 499 Elective Research. (1-3) May be repeated to a maximum of three credits. Elective for seniors in aerospace engineering with permission of the student's advisor and the instructor. Original research projects terminating in a written report.

ENAE 588 Professional Development Topics in Aerospace Engineering. (1-3) Prerequisite, permission of the instructor. Current topics in aerospace engineering chosen to provide for the professional development of practicing engineers. May not be credited toward a graduate school degree. Repeatable to a maximum of 3 credits.

ENAE 589 Professional Development Topics in Aerospace Engineering. (1-3) Prerequisite, permission of the instructor. Current topics in aerospace engineering chosen to provide for the professional development of practicing engineers. May not be credited toward a graduate school degree. Repeatable to a maximum of 3 credits.

Engineering, Civil

ENCE 221 Introduction to Environmental Engineering. (3) Prerequisite, one semester of chemistry and physics. An introductory course which provides an exposition of those physical, chemical, and biological systems relating to the quality of the land, water, and air environments. Current environmental pollution problems will be examined and methods of pollution abatement discussed.

ENCE 280 Engineering Survey Measurements. (3) Two lectures and one laboratory per week. Prerequisite, MATH 141 or concurrent registration. Standards, units, calibration, measurement of distance, elevation, angles, systematic and random error analysis in measurements, fundamentals of mapping, instrumentation.

ENCE 300 Fundamentals of Engineering Materials. (3) Two lectures and one laboratory per week. Prerequisite, ENES 220 or concurrent registration. Properties and constitution of the principal materials used in civil engineering. Laboratory tests for these properties, interpretation of test results and of specifications.

ENCE 330 Basic Fluid Mechanics. (3) Three lectures per week. Prerequisite, ENES 220, 221, PHYS 262. The study of fluids at rest and in motion. Principles of viscous and turbulent flow. Impulse and momentum concepts. Pumps, turbines and meters. Dimensional analysis and laws of similarity.

ENCE 340 Fundamentals of Soil Mechanics. (3) Three lectures per week. Prerequisite, ENES 220 and ENCE 300. Introductory study of the mechanics of agregations and its application to earthworks and foundations. Engineering geology relative to civil engineering and soil mechanics.

ENCE 350 Structural Analysis and Design I. (3) Prerequisites, ENES 220 and concurrent registration in ENCE 300. Methods of analysis of statically determinate structures for fixed and moving loads. Equilibrium, influence lines, stability, structural design of steel buildings and bridges, including design of tension members, beams, columns, trusses, and welded, bolted, and riveted connections.

ENCE 351 Structural Analysis and Design II. (3) Prerequisites, ENCE 300 and ENCE 350. Analyses for stresses in statically indeterminate beams and frames by approximate methods and by moment distribution. Influence lines and maximum shear and moment for continuous members. Design of reinforced concrete beams, continuous beams, and columns by elastic theory and by ultimate strength design.

ENCE 360 Engineering Analysis and Computer Programming. (4) Prerequisite, MATH 241. Introduction to the elements of Fortran and the algorithmic approach in the analysis of civil engineering problems. Methods of numerical analysis including the solution of linear systems of equations, numerical quadrature, differentiation, interpolation, and the solution of polynomial and transcendental equations. Instruction in the computer solution of civil engineering problems.

ENCE 370 Fundamentals of Transportation Engineering. (3) Prerequisite, ENCE 280. Engineering problems of transportation by airways, highways, pipelines, railways, and waterways. Elementary dynamics of traffic and function consideration of routes and terminals.

ENCE 410 Advanced Strength of Materials. (3) Three lectures per week. Prerequisite, ENES 220. Strength and deformation of deformable bodies, plane stress and strain. Torsion theory, unsymmetrical bending, curved beams. Behavior of beams, columns, slabs, plates and composite members unload. Elastic and inelastic stability.

ENCE 411 Experimental Stress Analysis. (4) Three lectures and one laboratory per week. Prerequisite, ENES 220. Application of experimental data on materials to design problems. Correlation of analytical and experimental methods of analysis with design. Electric strain gages, photoelasticity, brittle laquer methods and various analogies.

ENCE 420 Basic Civil Engineering Planning I. (3) Prerequisite, senior standing or consent of the instructor. Urban-regional physical planning from the civil engineering viewpoint. Integration of the planning aspects of engineering — environmental, structural, transportation and water resources — into a systems approach to the practice of civil engineering. Also included: site, construction, and engineering materials

planning, engineering economics and evaluation, current topics.

ENCE 430 Intermediate Fluid Mechanics. (4) Three lectures and one laboratory per week. Prerequisite, ENCE 330. Application of basic principles to the solution of engineering problems: ideal fluid flow, mechanics of fluid resistance, open channel flow under uniform, gradually varied and rapidly varied conditions, sediment transport, role of model studies in analysis and design.

ENCE 431 Surface Water Hydrology. (3) Prerequisites, ENCE 330 and 360. Concurrent registration in ENCE 460 or permission of instructor. Study of the physical processes of the hydrologic cycle. Hydrometology, concepts of weather modification, evaporation and transpiration infiltration studies, run off computations, flood routing, reservoir requirements, emphasis on process simulation as a tool in water resource development.

ENCE 432 Ground Water Hydrology. (3) Prerequisites, ENCE 330, 460 or permission of instructor. Concepts related to the development of the ground water resource, hydrogeology, hydrodynamics of flow through porous media, hydraulics of wells, artificial recharge, sea water intrusion, basin-wide ground water development.

ENCE 433 Environmental Health Engineering Analysis. (3) Two lectures and one laboratory per week. The theory and analytical techniques used in evaluating man's environment. Emphasis is given to the areas of quantitative, physical, electroanalytical and organic chemistry as applied to chemical analysis of water.

ENCE 434 Air Pollution. (3) Three lectures per week. Classification of atmospheric pollutants and their effects on visibility, inanimate and animate receptors. Evaluation of source emissions and principles of air pollution control; meteorological factors governing the distribution and removal of air pollutants; air quality measurements and air pollution control legislation.

ENCE 435 Sanitary Engineering Analysis and Design. (4) Three lectures and one laboratory per week. Prerequisite, ENCE 221 and ENCE 330. The application of sanitary analysis and fundamental principles to the design and operation of water and waste water treatment plants and the control of stream pollution.

ENCE 440 Advanced Soil Mechanics. (4) Three lectures and one laboratory per week. Prerequisite, ENCE 340. Theories of strength, compressibility, capillarity and permeability. Critical review of theories and methods of measuring essential properties. Planning, execution and interpretation of soil testing programs.

ENCE 441 Soil-Foundation Systems. (3) Three lectures per week. Prerequisites, ENCE 340. Soil mechanics and foundation analysis are integrated in a systems approach to the analysis and design of soil foundation-structural systems. Interaction of bearing capacity, settlements, lateral pressures, drainage, vibrations, stress distributions, etc., are included for a variety of structural systems.

ENCE 450 Design of Steel Structures. (3) Prerequisites, ENCE 350 and concurrent registration in ENCE 351. Analyses for stresses and deflections in structures by methods of consistent deformations, virtual work and internal strain energy. Application to design of plate girders, indeterminate and continuous trusses, two hinged arches and other structures. Elements of plastic analysis and design of steel structures.

ENCE 451 Design of Concrete Structures. (4) Prerequisites, ENCE 340 and ENCE 351. Three lecture hours and one laboratory per week. Design of reinforced concrete structures, including slabs, footings, composite members, building frames, and retaining walls. Approximate methods of analysis; code requirements; influence of concrete properties on strength and deflection; optimum design. Introduction to prestressed concrete design.

ENCE 460 Modern Techniques for Structural Analysis. (3) Prerequisites, ENCE 351, and ENCE 360. Two lecture hours and one laboratory per week. Application of computer oriented methods and numerical techniques to analysis and design of structural systems. Matrix formulation of the stiffness and flexibility methods for framed structures. Introduction of numerical techniques to the solution of selected problems in such topics as plates, structural stability, and vibrations.

ENCE 461 Analysis of Civil Engineering Systems I. (3) Prerequisite, senior standing or consent of instructor. Application of the principles of engineering economy and statistics to the solution of civil engineering problems. Economic comparison of alternatives using present worth, annual cost, rate of return and cost, rate of return and cost benefit analyses. Development and use of simple and multiple regression models, and statistical decision theory.

ENCE 463 Engineering Economics and System Analysis. (3) Prerequisite, senior standing in engineering, or consent of instructor. Development and application of the principles of engineering economics to problems in civil engineering. Evaluation of design alternatives, depreciation and sensitivity analysis. Use of systems analysis techniques, including CPM, PERT and decision networks.

ENCE 470 Highway Engineering. (4) Three lectures and one three-hour laboratory per week. Prerequisite, ENCE 340. Location, design, construction and maintenance of roads and pavements. Introduction to traffic engineering.

ENCE 471 Transportation Engineering. (3) Three lectures per week. Prerequisite, ENCE 370. A study of the principles of transportation engineering as applied to the various modes of transport. Consideration is given to cost analysis, economic aspects of route and site selection and layout. The organization and administration of engineering functions.

ENCE 472 Highway and Airfield Pavement Design. (3) Prerequisites, ENCE 340 and 370. Two lectures and one laboratory per week. Principles of pavement analysis and design. Analysis of moving loads and pavement response. Subgrade evaluation and beneficiation. Flexible and rigid pavement design; related materials specifications and tests.

ENCE 489 Special Problems. (3) Prerequisite, senior standing. A course arranged to meet the needs of exceptionally well prepared students for study in a particular field of civil engineering.

Engineering, Chemical

ENCH 215 Chemical Engineering Analysis I. (3) Prerequisite, CHEM 104 or equivalent. Introduction to methods of chemical engineering analysis. Stoichiometric relations, use of computers, stagewise computations, and application of material and energy balances to chemical engineering operations and processes.

ENCH 237 Chemical Technology Laboratory. (1) Prerequisite, ENCH 215 or concurrent registration. Techniques of basic chemical engineering measurement. Theory and application of temperature and pressure measurement. Basic thermodynamic measurements including calorimetry and vapor pressures. Methods of purification and detection of impurities in solids, liquids and gases. Elements of reaction kinetics.

ENCH 250 Chemical Engineering Analysis II. (2) Prerequisite, ENCH 215. Methods of chemical engineering analysis. Computational methods, optimization and control techniques, and other numerical tools applied to chemical processing systems. Analytical and computer methods are presented.

ENCH 295 Chemical Process Thermodynamics. (3) Prerequisite, CHEM 104. Principles of thermodynamics and their application to engineering problems. First and second laws of thermodynamics, properties of gases, liquids and solids, phase equilibrium, flow and non-flow systems, energy conversion, production of work from heat, thermodynamic analysis of processes, equilibrium stage operations and the thermodynamics of chemically reacting systems.

ENCH 333 Chemical Engineering Seminar. (1) Prerequisite, senior standing. Oral and written reports on recent developments in chemical engineering and the process industries.

ENCH 425 Transfer and Transport Processes I. (4) Prerequisite, ENCH 250. Theory and applications of molecular and turbulent transport phenomena. Principles of fluid mechanics, mass transfer and heat transfer. Dimensional analysis, analogy between heat, mass and momentum transfer, Newtonian and non-Newtonian flow, convective heat and mass transfer.

ENCH 427 Transfer and Transport Processes II. (3) Prerequisite, ENCH 425. Steady and unsteady state diffusion and conduction, simultaneous heat and mass transfer, interphase transfer, boundary layer theory. Application to absorption, adsorption, and distillation. Principles of radiant heat transfer, evaporation, filtration, crystallization, drying, condensation, boiling humidification, ion exchange, and phase separations.

ENCH 437 Chemical Engineering Laboratory. (3) Prerequisite, ENCH 427. Application of chemical engineering process and unit operation principles in small scale semi-commercial equipment. Data from experimental observations are used to evaluate performance and efficiency of operations. Emphasis is placed on correct presentation of results in report form.

ENCH 440 Chemical Engineering Kinetics. (3) Prerequisite, ENCH 250. Fundamentals of chemical reaction kinetics and their application to the design and operation of chemical reactors. Reaction rate theory, homogeneous reactions in batch and flow systems, adsorption, heterogeneous reactions and catalysis electrochemical reactions. Catalytic reactor design.

ENCH 442 Chemical Engineering Systems Analysis. (2) Differential equations or ENCH 453. Dynamic response applied to process systems. Goals and modes of control, LaPlace

transformations, analysis and synthesis of simple control systems, closed loop response, dynamic testing.

ENCH 443 Dynamics and Control Laboratory. (1) Corequisite, ENCH 442. Methods of process control. Use of experimental analog and mathematical models of control systems.

ENCH 445 Process Engineering and Design. (3) Prerequisite, ENCH 427. Utilization of chemical engineering principles for the design of process equipment. Typical problems in the design of chemical plants. Comprehensive reports are required.

ENCH 447 Chemical Engineering Economics. (2) Prerequisite, ENCH 427. Principles of engineering economics applied to chemical processes. Determination of investment and operating costs for chemical plants.

ENCH 450 Chemical Process Development. (3) Prerequisite, ENCH 427. Chemical process industries from the standpoint of technology, raw materials, products and processing equipment. Operations of major chemical processes and industries combined with quantitative analysis of process requirements and yields.

ENCH 452 Advanced Chemical Engineering Analysis. (3) Prerequisite, ENCH 425. Application of digital and analog computers to chemical engineering problems. Numerical methods, programming, differential equations, curve fitting, amplifiers and analog circuits.

ENCH 453 Applied Mathematics in Chemical Engineering. (3) Prerequisite, MATH 240. Mathematical techniques applied to the analysis and solution of chemical engineering problems. Use of differentiation, integration, differential equations, partial differential equations and integral transforms. Application of infinite series, numerical and statistical methods.

ENCH 454 Chemical Process Analysis and Optimization. (3) Prerequisites, ENCH 427, 440. Applications of mathematical models to the analysis and optimization of chemical processes. Models based on transport, chemical kinetics and other chemical engineering principles will be employed. Emphasis on evaluation of process alternatives.

ENCH 455 Chemical Process Laboratory. (2) Prerequisite, ENCH 427 and 440. Experimental study of various chemical processes through laboratory and small semi-commercial scale equipment. Reaction kinetics, fluid mechanics, heat and mass transfer.

ENCH 461 Control of Air Pollution Sources. (3) Prerequisite, senior standing in engineering or consent of instructor. Theory and application of methods for the control and removal of airborne materials. Principles of design and performance of air quality control equipment.

ENCH 468 Research. (2-3) Prerequisite, permission of the staff. Investigation of a research project under the direction of one of the staff members. Comprehensive reports are required.

ENCH 475 Electrochemical Engineering. (3) Prerequisite, ENCH 425. Fundamentals of electrochemistry with application to engineering and commercial processes. Equilibrium potentials, reaction mechanisms, cell kinetics, polarization, surface phenomena, electrorefining, electrowinning, oxidation and reduction, solid, liquid and gas systems. Aspects of design and performance of electroprocess plants.

ENCH 480 Engineering Analysis of Physiological Systems. (3) Engineering description and analysis of physiological systems. Survey of bioengineering literature and an introduction to mathematical modeling of physiological systems.

ENCH 482 Biochemical Engineering. (3) Prerequisite, senior standing in engineering or consent of instructor. Introduction to biochemical and microbiological applications to commercial and engineering processes, including industrial fermentation, enzymology, ultrafiltration, food and pharmaceutical processing and resulting waste treatment. Enzyme kinetics, cell growth, energetics and mass transfer.

ENCH 485 Biochemical Engineering Laboratory. (2) Prerequisite or corequisite, ENCH 482. Techniques of measuring pertinent parameters in fermentation reactors, quantification of production variables for primary and secondary metabolites such as enzymes and antibiotics, the insolubilization of enzymes for reactors, and the demonstration of separation techniques such as ultrafiltration and affinity chromatography.

ENCH 490 Introduction to Polymer Science. (3) Prerequisite, consent of instructor. The elements of the chemistry, physics, processing methods, and engineering applications of polymers.

ENCH 492 Applied Physical Chemistry of Polymers. (3) Prerequisite, CHEM 481. Corequisite, CHEM 482 or consent of instructor. Kinetics of formation of high polymers, determination of molecular weight and structure, and applied thermodynamics and phase equilibria of polymer solutions.

ENCH 494 Polymer Technology Laboratory. (3) Prerequisite, ENCH 490 or 492 or consent of instructor. One lecture and two lab periods per week. Measurement of mechanical, electrical, optical, thermal properties of polymers. Measurement of molecular weight by viscosimetry, isometric and light scattering methods. Application of x-ray, NMR, ESR, spectroscopy molecular relaxation, microscopy and electron microscopy to the determination of polymer structure, effects of ultraviolet light and high energy radiation.

ENCH 495 Rheology of Polymer Materials. (3) Prerequisite, ENCH 490 or 492 or consent of instructor. Mechanical behavior with emphasis on the continuum point of view and its relationship to structural types. Elasticity, viscoelasticity, anelasticity and plasticity of single phase and multiphase materials. (Students who have credit for ENCH 495 may not take ENMA 495 for credit.)

ENCH 496 Processing of Polymer Materials. (3) Prerequisite, ENCH 490 or 492 or consent of instructor. A comprehensive analysis of the operations carried out on polymeric materials to increase their utility. Conversion operations such as molding extrusion, blending, film forming, and calendering. Development of engineering skills required to practice in the high polymer industry. Students who have credit for ENCH 496 may not take ENMA 496 for credit.)

Engineering, Cooperative Education

ENCO 408 Co-Op Internship. (0) Professional internship in industry or government agency provides the practical work experiences which supplement and enhance the theories, principles and practices in the normal educational program. The student should register for ENCO 408 for each summer internship. He should register for both ENCO 408 and ENCO 409 for each semester internship.

ENCO 409 Co-Op Internship. (0) Professional internship in industry or government agency provides the practical work experiences which supplement and enhance the theories, principles and practices studied in the normal educational program. The student should register for ENCO 408 for each summer internship. He should register for both ENCO 408 and 409 for each semester internship.

Engineering, Electrical

ENEE 204 Systems and Circuits I. (3) Prerequisite, MATH 141. Required of sophomores in electrical engineering. Kirchhoff's laws, linear, nonlinear, and time-varying elements of systems and circuits. Solution of circuit differential equations, zero input, zero state, and complete response. Coupled elements, ideal transformers, controlled sources. Node and mesh analysis in the time domain.

ENEE 250 Computer Structures. (3) Prerequisite, ENES 243 or equivalent. Required of sophomores in electrical engineering. Basic structure and organization of digital computers; number systems and data representation; assembly language (some simple assembly language programs will be run), introduction to system software; gates and memory elements; logic design of simple digital systems; reliability; hardware/software tradeoffs.

ENEE 300 Principles of Electrical Engineering. (3) Prerequisites, MATH 241, PHYS 263. Corequisite, ENEE 301. Required of aerospace, mechanical and chemical engineers. Not applicable in the electrical engineering major program. Acceptable as prerequisite for some advanced ENEE courses. Analysis of linear systems, introduction to La Place transforms, steady-state A-C transforms, introduction to the concepts of electromagnetic fields and electric machines.

ENEE 301 Electrical Engineering Laboratory. (1) Two hours of laboratory per week. Corequisite, ENEE 300. Required of aerospace, mechanical, and chemical engineers. Experiments on the transient and steady-state response of linear circuits, electric machines, electron tubes and semi-conductor devices.

ENEE 302 Principles of Electrical Engineering. (3) Prerequisites, MATH 241 and PHYS 263. Corequisite, ENEE 303. Required of aerospace and chemical engineers. Not applicable in the electrical engineering major program. Acceptable as prerequisite for some advanced ENEE courses. Principles and circuit applications of semi-conductor devices and electron tubes.

ENEE 303 Electrical Engineering Laboratory. (1) Two hours of laboratory per week. Corequisite, ENEE 302. Required of aerospace and chemical engineers. Experiments on the transient and steady-state response of linear circuits, electric machines, electron tubes and semi-conductor devices.

ENEE 304 Systems and Circuits II. (3) Prerequisite, ENEE 204, pre- or corequisite, MATH 246. Required of juniors in electrical engineering. Sinusoidal analysis. General mesh and node analysis. Analysis by La Place transforms, network functions, network

theorems. Two-part theory, controlled sources, small-signal analysis of semiconductor devices. Fourier series.

ENEE 305 Fundamental Laboratory. (2) Corequisite, ENEE 204. Required of juniors in electrical engineering. One lecture and three lab hours per week. Concepts and techniques of physical measurements using standard electrical measuring devices: generators, oscilloscopes, voltmeters, etc. Measurements of linear and non-linear circuits; steady state and step response; integrated circuits. Handling and use of data.

ENEE 314 Electronic Circuits. (3) Prerequisite, ENEE 304. Required of electrical engineering majors. Characteristics of semi-conductor devices. Diodes; biasing and stabilization of bipolar and field effect transistors; power amplifier characteristics. Feedback amplifiers, integrated operational amplifiers; transistor switches, gates, and integrated logic circuits; bistable multivibrators and applications in counters, registers and selected digital networks.

ENEE 322 Signal and System Theory. (3) Prerequisites, ENEE 204 and MATH 246. Required of electrical engineering majors. Concept of linear systems, state space equations for continuous and discrete systems, time domain analysis of linear systems. Fourier series, Fourier, La Place and Z transforms. Application of theory to problems in electrical engineering.

ENEE 324 Engineering Probability. (3) Prerequisite, ENEE 322. Required of electrical engineering majors. Axioms of probability; conditional probability and Bayes' rules; random variables, probability distribution and densities; functions of random variables; weak law of large numbers and central limit theorem. Introduction to random processes; correlation functions, spectral densities, and linear systems. Applications to noise in electrical systems, filtering of signals from noise, estimation, and digital communications.

ENEE 380 Electromagnetic Theory. (3) Prerequisites, MATH 241 and PHYS 263. Required of juniors in electrical engineering. Introduction to electro-magnetic fields. Coulomb's law, Gauss's law, electrical potential, dielectric materials capacitance, boundary value problems, Biot-Savart law, Ampere's law, Lorentz force equation, magnetic materials, magnetic circuits, inductance, time varying fields and Maxwell's equations.

ENEE 381 Electromagnetic Wave Propagation. (3) Prerequisite, ENEE 380. Required of electrical engineering majors. Review of Maxwell's equations; the wave equation, potentials, Poynting's theorem. Transmission, Lossy medium, skin effect. Parallel-palte and rectangular wave-guides. Radiation, retarded potentials, radiation from dipole.

ENEE 402 Advanced Pulse Techniques. (3) (See ENEE 403 for optional related laboratory course.) Prerequisite, ENEE 314 or 410 or equivalent. Bistable, monostable, and astable circuits, sweep circuits, synchronization, counting, gates, comparators. Magnetic core circuits, semi-conductor and vacuum-tube circuits.

ENEE 403 Pulse Techniques Laboratory. (1) Two hours of laboratory per week. Corequisite, ENEE 402 and permission of the instructor. Experiments on switching circuits, bistable, monostable, and astable circuits, sweep circuits, gates, comparators.

ENEE 404 Radio Engineering. (3) Prerequisite, ENEE 314. Tuned circuit amplifiers, single, double, and stagger tuned circuits; class C amplifiers; frequency multipliers; amplitude modulation; modulators and detectors, receiver design and characteristics; frequency modulation; FM transmitters and receivers.

ENEE 405 Advanced Radio Engineering Laboratory. (1) Two hours of laboratory per week. Corequisite, ENEE 404. Experiments on multiple tuned amplifiers, noise figure measurements, Class C amplifiers, varactors, modulators, projects.

ENEE 406 Mathematical Foundations of Circuit Theory. (3) Prerequisites, ENEE 304 and MATH 241, or equivalent. Review of determinants, linear equations, matrix theory, eigenvalues, theory complex variables, inverse La Place transforms. Applications are drawn primarily from circuit analysis.

ENEE 407 Microwave-Circuits Laboratory. (2) Prerequisite, senior standing in electrical engineering or consent of instructor. One lecture and three lab hours per week. Experiments concerned with circuits constructed from microwave components providing practical experience in the design, construction and testing of such circuits. Projects include microwave filters and S-parameter design with applications of current technology.

ENEE 410 Electronic Circuits. (3) Prerequisite, ENEE 300 or equivalent knowledge of circuit theory or consent of the instructor. This course is intended for students in the physical sciences, and for engineering students requiring additional study of electron circuits. Credit not normally given for this course in an electrical engineering major program. (ENEE 413 may optionally be taken as an associated laboratory.) P-N junctions, transistors, vacuum tubes, biasing and operating point stability, switches, large-signal analysis, models, small-signal analysis, frequency response, feedback and multistage amplifiers, pulse and digital circuits.

ENEE 412 Telemetry Systems. (3) Prerequisite, ENEE 314. Selected digital circuits; frequency division multiplexing; FM/AM systems, SSB/FM systems; time division multiplexed systems; pulse amplitude modulation; pulse duration modulation; pulse code modulation; analog to digital converters; multiplexers and DC-commutators.

ENEE 413 Electronics Laboratory. (2) Corequisite, ENEE 314. One lecture and three lab hours per week. Provides experience in the specification, design, and testing of basic electronic circuits and practical interconnections. Emphasis on design with discrete solid state and integrated circuit components for both analog and pulse circuits.

ENEE 414 Network Analysis. (3) Prerequisite, ENEE 304. Network properties: linearity, reciprocity, etc.; 2-port descriptions and generalization; Y, S, hybrid matrices; description properties; symmetry, para-unity, etc.; basic topological analysis; state-space techniques; computer-aided analysis; sensitivity analysis; approximation theory.

ENEE 416 Network Synthesis. (3) Prerequisite, ENEE 304. Active and passive components, passivity, bounded and positive real, RC properties and synthesis, Brune and Darlington synthesis, transfer-voltage and Y21 synthesis, active feedback configurations, image parameter design, computer-aided optimization synthesis via the embedding concept.

ENEE 417 Advanced Network Theory. (3) Corequisite, ENEE 414 (or consent of instructor). A study of network descriptions for analysis and basic active synthesis. Indefinite and topological formulations, N-port structures and interconnections, active components and descriptions, synthesis using controlled sources, synthesis and analysis via state characterizations. Additional topics from non-linear, distributed parameter, and digital filters.

ENEE 418 Projects in Electrical Engineering. (1-3) Hours to be arranged. Prerequisites, senior standing and permission of the instructor. May be taken for repeated credit up to a total of 4 credits, with the permission of the student's advisor and the instructor. Theoretical and experimental projects.

ENEE 419 Apprenticeship in Electrical Engineering. (2-3) Hours to be arranged. Prerequisite, completion of sophomore courses and permission of an apprenticeship director. May be taken for repeated credit up to a total of nine credits. A unique opportunity for experience in experimental research and engineering design. A few highly qualified students will be selected as apprentices in one of the research facilities of the electrical engineering department and will participate in the current research under the supervision of the laboratory director. In the past, apprenticeships have been available in the following laboratories: biomedical, electron ring accelerator, gas laser, integrated circuits, simulation and computer, and solid state laser.

ENEE 420 Communication Theory. (3) Prerequisite, ENEE 324. Random signals: elements of random processes, noise, Gaussian process, correlation functions and power spectra, linear operations; optimum receivers, vector waveform channels, receiver implementation, probability of error performance; efficient signaling: sources, encoding, dimensionality, channel capacity; wave form communication; linear, angle, and pulse modulation.

ENEE 421 Introduction to Information Theory. (3) Prerequisite, ENEE 324. Definition of information and entropy; characterization of sources; Kraft and MacMillan inequalities; coding information sources; noiseless coding theorem; channels and mutual information; Shannon's coding theorem for noisy channels.

ENEE 425 Signal Analysis, Modulation and Noise. (3) Prerequisites, ENEE 314 and ENEE 324. Signal transmission through networks, transmission in the presence of noise, statistical methods of determining error and transmission effects, modulation schemes.

ENEE 432 Electronics for Life Scientists. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites, college algebra and a physics course, including basic electricity and magnetism. Not accepted for credit in an electrical engineering major program. The concept of an instrumentation system with emphasis upon requirements for transducers, amplifiers, and recording devices, design criteria and circuitry of power supplies amplifiers, and pulse equipment, specific instruments used for biological research, problems of shielding against hum and noise pickup and other interference problems characteristic of biological systems.

ENEE 433 Electronic Instrumentation for Physical Science. (3) Two hours of lecture and two hours of laboratory per week. Prerequisites, ENEE 300 or 306, PHYS 271 or equivalent, or consent of instructor. The concept of instrumentation systems from sensor to readout; discussions of transducers, system dynamics, precision and accuracy; measurement of electrical parameters; direct, differential, and potentiometric measurements; bridge measurements, time and frequency measurements, waveform generation and display.

ENEE 434 Introduction to Neural Networks and Signals. (3) Prerequisite, ENEE 204 or 300. Introduction in the generation and processing of bioelectric signals including structure and function of the neuron, membrane theory, generation and propagation of nerve impulses, synaptic mechanisms, transduction and neural coding of sensory events, central nervous system processing of sensory information and correlated electrical signals, control of effector organs, muscle contraction and mechanics, and models of neurons and neural networks.

ENEE 435 Electrodes and Electrical Processes in Biology and Medicine. (3) Prerequisite, ENEE 204 or 300. Techniques for recording biological signals such as brain, muscle and cardial electrical potentials; membrane theory; half-cell potentials, liquid junction potentials, polarization of electrodes; biological and medical instrumentation; and applications in the design of cardial pacemakers, or a similar case study.

ENEE 438 Topics in Biomedical Engineering. (1-3) Prerequisite, permission of the instructor. May be taken for repeated credit. The content may vary from semester to semester. Selected topics of current interest from such areas as bioelectric systems, modeling instrumentation, automated diagnostic, health-care delivery, etc. Repeatable to a maximum of 9 hours.

ENEE 440 Digital Computer Organization. (3) Prerequisite, CMSC 210 or ENES 243 or equivalent. Same as CMSC 410. Introduction; computer elements; parallel adders and subtracters; micro-operations; sequences; computer simulation; organization of a commercially available stored program computer; microprogrammed computers; a large scale batch processing system (optional). (Intended for those minoring in computers and for those majoring in computer science).

ENEE 442 Software Engineering. (3) Prerequisite, ENES 240; ENEE 250 or equivalent. Architectural aspects of software engineering. Machine language and machine structure; assembly language and assemblers; macro-language and macro-processors; loaders and linkers; programming languages and language structure; compilers and interpreters; operating systems.

ENEE 443 Introduction to Computers and Computation. (3) Prerequisite, ENES 243 or equivalent. Basic structure and organization of digital systems; representation of data, introduction to software systems; assembly language; application of computers in engineering and physical systems. Not open for students who have credit in ENEE 250.

ENEE 444 Logic Design of Digital Systems. (3) Prerequisite, ENEE 250. Review of switching algebra; gates and logic modules; map simplification techniques; multiple-output systems; memory elements and sequential systems; large switching systems; iterative networks; sample designs, computer oriented simplification algorithms; state assignment; partition techniques; sequential system decompositions.

ENEE 445 Computer Laboratory. (2) Prerequisite, ENEE 444. One lecture and three lab hours per week. Hardware oriented experiments providing practical experience in the design, construction, and checkout of components and interfaces for digital computers and data transmission systems. Projects include classical design techniques and applications of current technology.

ENEE 446 Computer Architecture. (3) Prerequisite, ENEE 250. Digital computer organization; arithmetic hardware; primary and secondary storage organization; read-only and associative memories; introduction to multi-processor and multi-programming computer systems; interaction of hardware and software.

ENEE 450 Introduction to Discrete Structures. (3) Prerequisite, ENES 243 or equivalent. Review of set algebra including relations, partial ordering and mappings. Algebraic structures including semigroups and groups. Graph theory including trees and weighted graphs. Boolean algebra and propositional logic. Applications of these structures to various areas of computer science and computer engineering.

ENEE 451 Introduction to Automata Theory. (3) Prerequisite, ENEE 450 or permission of the instructor. An introduction to finite state machines and their properties; properties of regular sets; elementary decomposition results; introduction to turing machines and computability theory; undecidability propositions; introduction to finite semigroups with application to the decomposition of finite state machines.

ENEE 456 Analog and Hybrid Computers. (3) Prerequisite, ENEE 310. Programming the analog computer; analog computing components; error analysis; repetitive operation; synthesis of systems using the computer; hybrid computer systems.

ENEE 460 Control Systems. (3) Prerequisite, ENEE 322. Review of transform analysis and linear algebra, mathematical models for control system components; transient response design, error analysis and design, root locus, frequency response, system design and compensation.

ENEE 461 Control Systems Laboratory. (2) Prerequisite, ENEE 460. One lecture and three lab hours per week. Projects to enhance the student's understanding of feedback control systems and to familiarize him with the characteristics and limitations of real control devices. Students will design, build, and test servomechanisms, and will conduct analog and hybrid computer simulations of control systems.

ENEE 462 Systems, Control and Computation. (3) Prerequisites, ENEE 300 or 304, and MATH 246 or consent of instructor. Matrix algebra, state space analysis of discrete systems, state space analysis of continuous sytems, computer algorithms for circuit analysis, optimization and system simulation.

ENEE 464 Linear System Theory. (3) Prerequisite, ENEE 322. An introduction to the state space theory of linear engineering systems; state variables, matrix exponential and impulse response. Linear sampled-data systems, discrete systems. Reliability, stability and equivalence. Relation to La Place transform. Application to circuits, controls, communications and computers.

ENEE 472 Transducers and Electrical Machinery. (3) Prerequisite, ENEE 304. Electromechanical transducers, theory of electromechanical systems, power and wideband transformers, rotating electrical machinery from the theoretical and performance points of view.

ENEE 473 Transducers and Electrical Machinery Laboratory. (1) Corequisite, ENEE 472. Experiments on transformers, synchronous machines, induction motors, synchros, loudspeakers, other transducers.

ENEE 480 Fundamentals of Solid State Electronics. (3) Prerequisite, ENEE 381. Review of Maxwell's equation, electromagnetic properties of dielectrics; introduction to quantum mechanics and quantum statistics; classical and quantum theory of metals; theory of semiconductors and semiconductor devices; principle of magnetic devices and selected topics.

ENEE 481 Antennas. (3) Prerequisite, ENEE 381. Introduction to the concepts of radiation, generalized far field formulas; antenna theorems and fundamentals; antenna arrays, linear and planar arrays; aperture antennas; terminal impedance; propagation.

ENEE 483 Electromagnetic Measurements Laboratory. (2) Prerequisites, ENEE 305 and ENEE 380. One lecture and three lab hours per week. Experiments designed to provide familiarity with a large class of micro-wave and optical components, techniques for interconnecting them into useful systems, and techniques of high frequency and optical measurements.

ENEE 487 Particle Accelerators, Physical and Engineering Principles. (3) Three hours of lecture per week. Prerequisites, ENEE 380, and PHYS 420, or consent of the instructor. Sources of charged particles; methods of acceleration and focusing of ion beams in electromagnetic fields; basic theory, design, and engineering principles of particle accelerators.

ENEE 488 Topics in Electrical Engineering. (3) Prerequisite, permission of the instructor. May be taken for repeated credit up to a total of six credits, with the permission of the student's advisor and the instructor.

ENEE 496 Physical Electronics of Devices. (3) Pre- or corequisite, ENEE 381. Three lecture hours per week. Optical resonators, Fabry-Perot Etalon. Theory of laser oscillation, rate equations. Gaseous, solid state, semiconductor and dye laser systems. Electro-optic effects and parametric oscillators. Holography.

Engineering Science

ENES 101 Introductory Engineering Science. (3) Basic languages of the engineer. Elements of graphic communication and analysis. Orthographic projection, conventions, graphs and curve-fitting. Introduction to Fortran computer language. Engineering orientation, selection of a major and career goals.

ENES 110 Statics. (3) Two lectures and two drill periods a week. Corequisite, MATH 140. The equilibrium of stationary bodies under the influence of various kinds of forces. Forces, moments, couples, equilibrium, trusses, frames and machines, centroids, moment of

inertia, beams, and friction. Vector and scalar methods are used to solve problems.

ENES 120 Noise Pollution. (3) An introduction to the sources and the effects of noise pollution in the modern environment. Physical properties of sound and methods of measurement. Noise abatement methods. Public policy approaches to the control of environmental noise.

ENES 121 The Man Made World. (3) Introduction to technology created to enhance the operation of contemporary society. Study of the conception and operation of technological systems. Examples of systems for transportation, communications, information, and energy supply. Concepts of modeling, feedback and stability applied to the analysis, interpretation and understanding of the behavior of technological systems and their impact on society.

ENES 131 Introduction to Flight. (3) An elementary course in aeronautics appropriate for both science and non-science students. The elements of flight as exemplified by the flight of birds and the historical development of the airplane. Navigation and control of the aircraft, weather as it affects aviation, flight instruments, and the operation of the U.S. civil aviation system. One hour of flight simulator experience is included.

ENES 220 Mechanics of Materials. (3) Three lectures a week. Prerequisites, MATH 141, PHYS 161, and ENES 110. Distortion of engineering materials in relation to changes in stress or temperature. Geometry of internal strain and external displacement. Application to beams, columns, shafts, tanks, and other structural, machine and vehicle members.

ENES 221 Dynamics. (3) Three lectures a week. Prerequisites, ENES 110, and concurrent registration in MATH 240 and PHYS 262. Systems of heavy particles and rigid bodies at rest and in motion. Force acceleration, work-energy and impulse-momentum relationships. Motion of one body relative to another in a plane and in space.

ENES 230 Materials Science. (3) Three lectures a week. Prerequisite, ENES 220. Basic principles, nature, and properties of engineering materials. Structure of matter, phase transformations and mechanical properties of metals, ceramics, polymers and related materials, electrical, thermal and magnetic properties, corrosion and radiation damage, friction and wear, diffusion.

ENES 240 Algorithmic Analysis and Computer Programming. (3) Prerequisite, MATH 141. Two lectures and one two-hour laboratory per week. Basic programming concepts; algorithms; use of flowcharts. Introduction to numerical methods; solutions to linear equations, roots of functions, integration. Use of data structures; arrays, lists, trees. Fundamentals of Fortran programming and computer laboratory experience in Fortran programming.

ENES 401 Technological Assessment. (3) Prerequisite, senior standing or consent of instructor. Analysis of assessing technology in terms of goals and resources. Public and private constraints, changes in objectives and organization. Applications to engineering technology.

ENES 405 Power and the Environment. (3) Prerequisite, junior standing or consent of the instructor. An introduction to the power needs of society. The interrelationship between man's use of energy and the effect on the eco-system. Introduction to the techniques of power production with special emphasis on nuclear fueled power plants.

ENES 473 Principles of Highway and Traffic Engineering. (3) Prerequisites, permission of instructor. Designed to assist the non-engineer in understanding highway transportation systems. A survey of the fundamentals of traffic characteristics and operations. Study of the methods and implementation of traffic control and regulation. An examination of highway design procedures, and the role of traffic engineering in transportation systems safety improvements.

ENES 508 Engineering Professional Development. (2) Prerequisite, B.S. in engineering or consent of instructor. Subjects as announced. Review and extension of subject areas covered at the undergraduate level. Preparation for EIT examination, licensing, and other professional requirements. Not applicable towards a graduate degree.

Engineering, Fire Protection

ENFP 251 Introduction to Fire Protection Engineering. (3) Analysis of the social, economic, environmental, organizational and legal dimensions of the fire problem. Examination of the theoretical principles relating to basic fire phenomena and theories of extinguishment. Introduction to fire research.

ENFP 280 Urban Fire Problem Analysis. (3) Intensive study of the urban fire problem. Operations research techniques and systems engineering are utilized as analytical procedures for the technological assessment of public fire protection. Traditional assessment methods and urban analysis.

ENFP 310 Fire Protection Systems Design I. (3) Prerequisite, ENFP 312. Study of aqueous suppression system agents and their application to selected fire protection problems. Examination of specifications, code criteria, published criteria and research utilized in the engineering design of aqueous agent suppression systems. Application of hydraulic theory to a range of design considerations. Problem calculations based upon student prepared design layouts.

ENFP 312 Fire Protection Fluids. (3) Corequisite, ENCE 330. Study of fluid flow principles for fire protection systems. Analysis of hydrostatic and hydrodynamic problems associated with municipal and industrial water supply distribution systems. Calculation methods, techniques, and procedures for hydraulically designed distribution networks to meet prescribed conditions of adequacy and reliability of the total system.

ENFP 320 Pyrometrics of Materials. (3) Analysis and study of characteristics of materials, and material assemblies related to flame spread, fuel contribution, combustibility and smoke development. Analysis of fuel geometry and configuration to fire severity. Procedures of laboratory analysis, determination and modeling.

ENFP 321 Functional and Structural Analysis. (3) Prerequisite, ENFP 320. Examination of the functional and structural components of buildings and building complexes relative to modular fire loss potential. Analytical concepts and research developments related to modular loss evaluations. Investigation of the performance criteria of building and fire prevention codes.

ENFP 411 Fire Protection Hazard Analysis. (3) Prerequisites, ENFP 251, 310; corequisite, ENFP 415. Examination of diffusion flame phenomena and material flame propagation and development in industrial and related environments. Synthesis of design procedures relative to the total application of fire protection engineering with economic and cost benefit analysis.

ENFP 414 Life Safety Systems Analysis. (3) Prerequisite, ENFP 321. Detailed examination and study of the physical and psychological variables related to the occurrence of fire casualties. The investigation of functional features of smoke movement and egress. Review of systematic procedures for analysis of life safety in structures, and the incorporation of such procedures into the design process.

ENFP 415 Fire Protection System Design II. (3) Prerequisite, ENFP 310, 312. Study of gaseous and particulate fire suppression systems plus hazard detection systems. Examination and evaluation of code criteria, performance specifications and research relation to the study areas. Application of fluid theory to the design layout and the calculation procedures for gaseous and particulate fire suppression systems. Functional analysis and design layout of detection systems. An integrated fire protection systems design project.

ENFP 416 Problem Synthesis and Design. (3) Prerequisite, senior standing. Techniques and procedures of problem orientation and solution design utilizing logical and numerical procedures. Student development of research projects in selected areas.

ENFP 489 Special Topics. (3) Prerequisite, permission of the department. Selected topics of current importance of fire protection. Limited to a total of 6 credits.

English

ENGL 101 Introduction to Writing. (3) An introductory course in expository writing.

ENGL 102 Introduction to Literature. (3) Open only to students who have passed or are exempted from ENGL 101. Further practice in writing, along with readings in the modern novel, short story, poetry, and drama.

ENGL 103 Accelerated English Composition. (1) An accelerated course in rhetoric and in the methods of research. Designed for students who attain sufficiently high scores on an appropriate placement test or an advanced placement score of 2. Not open for credit to students who have credit for ENGL 101, ENGL 171, HONR 100, or equivalent.

ENGL 104 Introduction to Writing: The Sentence. (1) A one-credit course in partial fulfillment of the competency requirement in English composition. The sentence and its elements will be studied for the purpose of teaching students how to write the types of sentences necessary for completing college-level assignments. English 104 is limited to students whose test scores and writing samples indicate inability to take English 101.

ENGL 105 Introduction to Writing: The Paragraph. (1) Prerequisite, ENGL 104. A one-credit course in partial fulfillment of the competency requirement in English composition. The paragraph and its elements will be studied for the purpose of teaching students how to write the types of paragraphs

necessary for completing college-level assignments.

ENGL 106 Introduction to Writing: The Composition. (1) Prerequisite, ENGL 105. A one-credit course in partial fulfillment of the competency requirement in English composition. The composition will be studied for the purpose of teaching students how to complete some types of writing assignments that are required in college.

ENGL 171 Honors Composition. (3) Survey of principles of composition, rhetoric, and techniques of research; reading in essays, short stories, poetry; frequent themes.

ENGL 201 World Literature. (3) Homer to the Renaissance, foreign classics being read in translation.

ENGL 202 World Literature. (3) Shakespeare to the present, foreign classics being read in translation.

ENGL 211 English Literature from the Beginnings to 1800. (3)

ENGL 212 English Literature from 1800 to the Present. (3)

ENGL 221 American Literature — Beginning to 1865. (3)

ENGL 222 American Literature — 1865 to Present. (3)

ENGL 241 Introduction to the Novel. (3)

ENGL 242 Readings in Biography. (3) An analytical study in the form and technique of biographical writing in Europe and America.

ENGL 243 Introduction to Poetry and Poetics. (3)

ENGL 244 Introduction to Dramatic Literature. (3) A survey of the basic literature of drama from the classical Greeks to modern times.

ENGL 245 Introduction to Film as Literature. (3) Primary attention is on the film as a narrative medium, but other literary models will be examined.

ENGL 250 Women In Literature. (3) Images of women in literature by and about women.

ENGL 270 Introduction to English Honors. (3) Intensive study of a limited number of works drawn from five major genres (drama, narrative poetry, lyric poetry, prose fiction, prose non-fiction). An introduction for the beginning honors student to the major genres, literary backgrounds, chronological divisions and methods of approaching English and American literature. Required for graduation with honors.

ENGL 271 Honors World Literature. (3) Homer to the Renaissance, foreign classics being read in translation.

ENGL 272 Honors World Literature. (3) Shakespeare to the present, foreign classics being read in translation.

ENGL 278 Special Topics in Literature. (3) Repeatable to a maximum of 9 hours.

ENGL 280 Introduction to Linguistics. (3)

ENGL 291 Expository Writing. (3)

ENGL 292 Composition and Literary Types. (3) Not open to students who have taken ENGL 171. A study of literary genres with writing based on the readings.

ENGL 293 Technical Writing. (3)

ENGL 294 Introduction to Creative Writing. (3) Additional prerequisite, sophomore standing.

English 300 and 400 Level Course Prerequisites:
Any two freshman or sophomore English courses, with the exception of ENGL 293 and ENGL 294.

ENGL 301 Critical Methods in the Study of Literature. (3) An introduction to the techniques of literary analysis and a brief survey of the most common approaches to literature. Required of all English and American literature majors.

ENGL 345 Twentieth Century Poetry. (3) A one-semester survey course in British and American poetry from Yeats and Robinson to the present. Special emphasis on Yeats, Pound, Eliot, Williams, Roethke, and Lowell. Not open to students who already have credit for ENGL 445 or 446.

ENGL 378 Independent Research in English. (1-6) Prerequisite, consent of instructor. Designed to provide qualified majors in English an opportunity to pursue specific English readings under the supervision of a member of the department. Repeatable to a maximum of 6 credits.

ENGL 401 English Medieval Literature in Translation. (3)

ENGL 402 Chaucer. (3)

ENGL 403 Shakespeare. (3) Early period: histories and comedies.

ENGL 404 Shakespeare. (3) Late periods: tragedies and romances.

ENGL 405 The Major Works of Shakespeare. (3) Students who have credit for ENGL 403 or 404 cannot receive credit for ENGL 405.

ENGL 407 Literature of the Renaissance. (3)

ENGL 410 Edmund Spenser. (3)

ENGL 411 Literature of the Renaissance. (3)

ENGL 412 Literature of the Seventeenth Century, 1600-1660. (3)

ENGL 414 Milton. (3)

ENGL 415 Literature of the Seventeenth Century, 1660-1700. (3)

ENGL 416 Literature of the Eighteenth Century. (3) Age of Pope and Swift.

ENGL 417 Literature of the Eighteenth Century. (3) Age of Johnson and the Preromantics.

ENGL 418 Major British Writers. (3) Two writers studied intensively each semester.

ENGL 419 Major British Writers. (3) Two writers studied intensively each semester.

ENGL 420 Literature of the Romantic Period. (3) First generation: Blake, Wordsworth, Coleridge, et. al.

ENGL 421 Literature of the Romantic Period. (3) Second generation: Keats, Shelley, Byron, et. al.

ENGL 422 Literature of the Victorian Period. (3) Early years.

ENGL 423 Literature of the Victorian Period. (3) Middle years.

ENGL 424 Late Victorian and Edwardian Literature. (3) A study of the literary movements and techniques which effected the transition from Victorian to modern literature.

ENGL 425 Modern British Literature. (3) An historical survey of the major writers and literary movements in English prose and poetry since 1900.

ENGL 430 American Literature, Beginning to 1810, the Colonial and Federal Periods. (3)

ENGL 431 American Literature, 1810 to 1865, The American Renaissance. (3)

ENGL 432 American Literature, 1865 to 1914, Realism and Naturalism. (3)

ENGL 433 American Literature, 1914 to the Present, The Modern Period. (3)

ENGL 434 American Drama. (3)

ENGL 435 American Poetry — Beginning to the Present. (3)

ENGL 436 The Literature of American Democracy. (3)

ENGL 437 Contemporary American Literature. (3) A survey of the poetry, prose, and drama written in America in the last decade.

ENGL 438 Major American Writers. (3) Two writers studied intensively each semester.

ENGL 439 Major American Writers. (3) Two writers studied intensively each semester.

ENGL 440 The Novel in America to 1910. (3)

ENGL 441 The Novel in America since 1910. (3)

ENGL 442 Literature of the South. (3) An historical survey, from eighteenth-century beginnings to the present.

ENGL 443 Afro-American Literature. (3) An examination of the literary expression of the Negro in the United States, from its beginning to the present.

ENGL 444 Experimental Approaches to Literature — Emerson and Thoreau. (3) Variable subject matter presented in experimental methods and approaches. Grading in satisfactory/fail only. Consent of instructor required for admission.

ENGL 445 Modern British and American Poetry. (3) Prerequisite, permission of instructor required for students with credit in ENGL 345. A study of the formation of the 'modern tradition' in British and American poetry, exploring the distinctive energy and consciousness in the poets of the early twentieth century (1896-1930). Special emphasis on Hopkins, Yeats, Pound, Eliot, and Stevens. Collateral readings in essays on modern poetics, and in other poets of the period.

ENGL 446 Contemporary British and American Poetry. (3) Prerequisite, permission of instructor required for students with credit in ENGL 345. A study of British and American poetry from the Depression to the present. Special emphasis on Auden, Williams, Dylan Thomas, Theodore Roethke, Robert Lowell. A more general study of the work of some of these: Berryman, Jarrell, Fuller, Bishop, Wright, Kinnell, Larkin and including the projectivists, the beats and the present scene.

ENGL 447 Satire. (3) An introduction to English and American satire from Chaucer to the present.

ENGL 449 Playwriting. (3)

ENGL 450 Elizabethan and Jacobean Drama. (3) Beginnings to Marlowe.

ENGL 451 Elizabethan and Jacobean Drama. (3) Jonson to Webster.

ENGL 452 English Drama from 1660 to 1800. (3)

ENGL 453 Literary Criticism. (3)

ENGL 454 Modern Drama. (3)

ENGL 455 The English Novel. (3) Eighteenth century.

ENGL 456 The English Novel. (3) Nineteenth century.

ENGL 457 The Modern Novel. (3)

ENGL 460 Introduction to Folklore. (3)

ENGL 461 Folk Narrative. (3) Studies in legend, tale and myth. Prerequisite, ENGL 460.

ENGL 462 Folksong and Ballad. (3) Prerequisite, ENGL 460.

ENGL 463 American Folklore. (3) Prerequisite, ENGL 460. An examination of American folklore in terms of history and regional folk cultures. Exploration of collections of folklore from various areas to reveal the difference in regional and ethnic groups as witnessed in their oral and literary traditions.

ENGL 464 Afro-American Folklore and Culture. (3) An examination of the culture of the Negro in the United States in terms of history (antebellum to the present) and social changes (rural to urban). Exploration of aspects of Negro culture and history via oral and literary traditions and life histories.

ENGL 465 Urban Folklore. (3) Prerequisite, ENGL 460. An examination of the folklore currently originating in white, urban, American culture.

ENGL 470 Honors Conference and Reading. (1) Prerequisite, candidacy for honors in English. Candidates will take ENGL 470 in their junior year and ENGL 471 in their senior year.

ENGL 471 Honors Conference and Reading. (1) Prerequisite, candidacy for honors in English. Candidates will take ENGL 470 in their junior year and ENGL 471 in their senior year.

ENGL 473 Senior Proseminar in Literature. (3) Open only to seniors. Required of candidates for honors and strongly recommended to those who plan to do graduate work. Individual reading assignments; term paper.

ENGL 476 Modern Fantasy and Science Fiction. (3) Major works of fantasy and science fiction since the mid-eighteenth century, emphasizing their continuity and their relationships to philosophical speculation, scientific discovery, literary history and cultural change.

ENGL 479 Selected Topics in English and American Literature. (3)

ENGL 481 Introduction to English Grammar. (3) A brief review of traditional English grammar and an introduction to structural grammar, including phonology, morphology and syntax.

ENGL 482 History of the English Language. (3)

ENGL 483 American English. (3)

ENGL 484 Advanced English Grammar. (3) Credit may not be granted in both ENGL 484 and LING 402.

ENGL 485 Advanced English Structure. (3)

ENGL 486 Introduction to Old English. (3) An introduction to the grammar, syntax, and phonology of Old English. Selected readings from Old English prose and poetry.

ENGL 489 Special Topics in English Language. (3) Studies in topics of current interest; repeatable to a maximum of 9 hours.

ENGL 493 Advanced Expository Writing. (3)

ENGL 498 Creative Writing. (3)

ENGL 499 Advanced Creative Writing. (3)

Engineering, Materials

ENMA 300 Materials Science and Engineering. (3) Prerequisite, ENES 220. Basic principles, nature and properties of engineering materials. Processes and methods to manufacture and usefully apply engineering materials. Fabrication techniques for metals, polymers, and refractories. Students who have credit for ENMA 300 may not take ENME 300 for credit.

ENMA 301 Materials Engineering Laboratory. (1) Pre- or corequisite, ENMA 300. One laboratory a week. Fatigue, tensile and impact testing, heat treatment and hardenability, structure and properties of steels, case studies. Students who have credit for ENMA 301 may not ENME 301 for credit.

ENMA 462 Deformation of Engineering Materials. (3) Prerequisites, ENES 230 or consent of instructor. Relationship of structure to the mechanical properties of materials. Elastic and plastic deformation, microscopic yield criteria, state of stress and ductility. Elements of dislocation theory, work hardening, alloy strengthening, creep, and fracture in terms of dislocation theory.

ENMA 463 Chemical, Liquid and Powder Processing of Engineering Materials. (3) Prerequisite, ENES 230 or consent of instructor. Methods and processes used in the production of primary metals. The detailed basic principles of beneficiation processes, pyrometallurgy, hydrometallurgy, electrometallurgy, vapor phase processing and electroplating. Liquid metal processing including casting, welding, brazing and soldering. Powder processing and sintering. Shapes and structures produced in the above processes.

ENMA 464 Environmental Effects on Engineering Materials. (3) Prerequisites, ENES 230 or consent of instructor. Introduction to the phenomena associated with the resistance of materials to damage under severe environmental conditions. Oxidation, corrosion, stress corrosion, corrosion fatigue and radiation damage are examined from the point of view of mechanism and influence on the properties of materials. Methods of corrosion protection and criteria for selection of materials for use in radiation environments.

ENMA 470 Structure and Properties of Engineering Materials. (3) A comprehensive survey of the atomic and electronic structure of solids with emphasis on the relationship of structure to the physical and mechanical properties.

ENMA 471 Physical Chemistry of Engineering Materials. (3) Equilibrium multicomponent systems and relationship to the phase diagram. Thermodynamics of polycrystalline and polyphase materials. Diffusion in solids, kinetics of reactions in solids.

ENMA 472 Technology of Engineering Materials. (3) Relationship of properties of solids to their engineering applications. Criteria for the choice of materials for electronic, mechanical and chemical properties. Particular emphasis on the relationships between structure of the solid and its potential engineering application.

ENMA 473 Processing of Engineering Materials. (3) The effect of processing on the structure of engineering materials. Processes considered include refining, melting and solidification, purification by zone refining, vapor phase processing, mechanical working and heat treatments.

ENMA 495 Rheology of Engineering Materials. (3) Prerequisites, ENES 230 or consent of instructor. Study of the deformation and flow of engineering materials and its relationship to structural type. Elasticity, viscoelasticity, anelasticity and plasticity of single phase and multiphase materials. Students who have credit for ENMA 495 may not take ENCH 495 for credit.

ENMA 496 Polymeric Engineering Materials. (3) Prerequisite, ENES 230. A comprehensive summary of the fundamentals of particular interest in the science and applications of polymers. Polymer single crystals, transformations in polymers, fabrication of polymers as to shape and internal structure. Students who have credit for ENMA 496 may not take ENCH 496 for credit.

Engineering, Mechanical

ENME 200 Introduction to Mechanical Engineering. (3) Three lectures a week. Prerequisites, CHEM 104, MATH 141, and PHYS 161. Development of the student's capacity to solve engineering problems by the application of fundamental principles and fully defined procedures. Several projects require the use of a computer.

ENME 215 Principles of Mechanical Engineering. (3) Three lectures a week. Prerequisites, MATH 141, PHYS 263. Required of civil engineers. Laws and corollaries of classical thermodynamics. Properties and characteristics of pure substances and perfect gases, vapor and gas cycles. Mixture of gases including applications to psychrometry. Introduction to heat transfer.

ENME 216 Thermodynamics I. (3) Three lectures a week. Prerequisites, PHYS 262, MATH 141. Required of sophomores in mechanical and aeronautical engineering. Properties, characteristics and fundamental equation of gases and vapors. Application of first and second laws of thermodynamics in the analysis of basic heat engines, air compression and vapor cycles. Flow and non-flow processes for gases and vapors.

ENME 300 Materials Science and Engineering. (3) Prerequisite, ENES 220. Three lectures a week. Basic principles, nature and properties of engineering materials. Processes and methods to manufacture and usefully apply engineering materials. Fabrication techniques for metals, polymers, and refractories. Students who have credit for ENME 300 may not take ENMA 300 for credit.

ENME 301 Materials Engineering Laboratory. (1) Pre- or corequisite, ENME 300. One laboratory a week. Fatigue, tensile and impact testing, heat treatment and hardenability, structure and properties of steels, case studies. Students who have credit for ENME 301 may not take ENMA 301 for credit.

ENME 320 Thermodynamics. (3) Three lectures a week. Prerequisite, MATH 141, PHYS 262. The properties, characteristics and fundamental equations of gases and vapors. Application of the first and second laws of thermodynamics in the analysis of basic heat engines, air compression and vapor cycles. Flow and non-flow processes for gases and vapors.

ENME 321 Transfer Processes. (3) Three lectures a week. Prerequisites, ENME 342 and ENME 382. Conduction by steady state and transient heat flow, laminar and turbulent flow, free and forced convection, radiation, evaporation and condensation vapors. Transfer of mass, heat, and momentum.

ENME 341 Gas Dynamics. (3) Three lectures a week. Prerequisite, ENME 342. Compressible flow in ducts and nozzles. Effect of area change, heat addition, friction, and normal shocks. Thermodynamics of chemically reacting flows, combustion and equilibrium.

ENME 342 Fluid Mechanics I. (3) Three lectures a week. Prerequisite, ENME 216. Fluid flow concepts and basic equations, effects of viscosity and compressibility. Dimensional analysis and laws of simularity.

Flow through pipes and over immersed bodies. Principles of flow measurement.

ENME 343 Fluid Mechanics Laboratory. (1) One laboratory a week. Laboratory to be taken concurrently with ENME 342. Measurement of fluid properties, determination of pressure drops in pipes and fittings, observation of fluid phenomena. Experiment and demonstration of flow measurement techniques.

ENME 360 Dynamics of Machinery. (3) Three lectures a week. Prerequisites, ENES 221, ENME 380 concurrently. Dynamic characteristics of machinery with emphasis on systems with single and multiple degree of freedom.

ENME 380 Applied Mathematics in Engineering. (3) Prerequisite, MATH 141. Mathematical techniques applied to the analyses and solutions of engineering problems. Use of differentiation, integration, differential equations, partial differential equations and integral transforms. Application of infinite series, numerical and statistical methods.

ENME 381 Measurements Laboratory. (3) Two lectures and one laboratory period a week. Prerequisites, ENME 360 and ENEE 300. Concurrently, ENME 342. Required of juniors in mechanical engineering. Measurements and measurement systems, application of selected instruments with emphasis on interpretation of results.

ENME 382 Engineering Analysis and Computer Programming. (3) Three lectures a week. Prerequisites, ENME 380, or MATH 246. Elements of operational calculus, vector analysis, numerical methods and programming for computers. Errors, interpolation series, integration, interaction and solution of equations.

ENME 400 Machine Design. (3) Two lectures and one laboratory period a week. Prerequisite, ENME 300, 360. Working stresses, stress concentration, stress analysis and repeated loadings. Design of machine elements. Kinematics of mechanisms.

ENME 401 Mechanical Engineering Analysis and Design. (4) Two lectures and two laboratory periods per week. Prerequisite, senior standing in mechanical engineering or consent of instructor. Engineering design practice as illustrated by discussions of selected case studies. Design projects involving the application of technology to the solution of industrial and community problems. Legal and ethical responsibility of the designer.

ENME 402 Selected Topics in Engineering Design. (3) Three lecture periods per week. Prerequisite, senior standing in mechanical engineering or consent of instructor. Creativity and innovation in design. Generalized performance analysis, reliability and optimization as applied to the design of components and engineering systems. Use of computers in design. Design of multi-variable systems.

ENME 403 Automatic Controls. (3) Three lectures per week. Prerequisites, ENEE 300, senior standing. Hydraulic, electrical, mechanical and pneumatic automatic control systems. Open and closed loops. Steady state and transient operation, stability criteria, linear and non-linear systems. La Place transforms.

ENME 410 Operations Research I. (3) Three lectures a week. Prerequisite, senior standing in mechanical engineering. Applications of linear programming, queuing model, theory of games and competitive models to engineering problems.

ENME 411 Introduction to Industrial Engineering. (3) Three lectures per week. Prerequisites, ENME 300 and ECON 205 or consent of instructor. This course is concerned with the design, improvement and installation of integrated systems of men, materials and equipment. Areas covered include industrial activities, plant layout and design, value analysis, engineering economics, quality and production control, methods engineering, industrial relations, etc.

ENME 414 Solar Energy Applications in Buildings. (3) Crosslisted as ARCH 414 and ENME 414. Prerequisites, ARCH 311, or ENME 321 (or equivalent), or consent of instructor. Lecture, three hours per week. Methods of utilizing solar energy to provide heating, cooling, hot water, and electricity for buildings; survey of related techniques for reducing energy consumption in buildings. Flat-plate and focusing solar collectors, heating and cooling systems, water heaters, energy storage, solar cells, solar-thermal power systems. Quantitative evaluation of system efficiencies; economics of solar energy utilization; structural and esthetic integration of solar collectors and system components into building designs.

ENME 420 Energy Conversion. (3) Three lectures a week. Prerequisite, ENME 320. Required of seniors in electrical engineering. Chemical, heat, mechanical, nuclear and electrical energy conversion processes, cycles and systems. Direct conversion processes of fuel cells, thermionics and magnetohydro-mechanics.

ENME 421 Energy Conversion I. (3) Three lectures a week. Prerequisites, ENME 321, ENME 342. Application of the principles of thermodynamics, fluid mechanics and heat transfer to chemical, thermal, mechanical, nuclear and electrical energy conversion processes, cycles and systems. Reciprocating, turbine and rocket power plants using all types of heat and reaction sources. Environmental effects of energy conversion processes.

ENME 422 Energy Conversion II. (3) Three lectures a week. Prerequisite, ENME 421. Advanced topics in energy conversion. Direct conversion processes of fuel cells, solar cells, thermionics, thermoelectrics and magnetohydrodynamics.

ENME 423 Environmental Engineering. (3) Three lectures a week. Prerequisites, ENME 321, 360, senior standing in mechanical engineering. Heating and cooling load computations. Thermodynamics of refrigeration systems. Low temperature refrigeration. Problems involving extremes of temperature, pressure, acceleration and radiation.

ENME 424 Thermodynamics II. (3) Three lectures a week. Prerequisites, ENME 321, senior standing. Applications to special systems, change of phase, low temperature. Statistical concepts, equilibrium, heterogenous systems.

ENME 442 Fluid Mechanics II. (3) Three lectures a week. Prerequisite, ENME 342, senior standing. Hydrodynamics with engineering applications. Stream function and velocity potential, conformal transformations, pressure distributions, circulation, numerical methods and analogies.

ENME 450 Mechanical Engineering Analysis for the Oceanic Environment. (3) Prerequisite, junior standing. Study of the characteristics of the marine environment which affect the design, operation and maintenance of mechanical equipment, effects of waves, currents, pressure, temperature, corrosion, and fouling. Study of design parameters for existing and proposed mechanical systems used in marine construction, on shipboard, in search and salvage operations.

ENME 451 Mechanical Engineering Systems for Underwater Operations. (3) Prerequisite, ENME 450 or consent of instructor. Study of propulsion, control and environmental systems for submerged vehicles. Design of mechanical systems in support of diving and saturated living operations.

ENME 452 Physical and Dynamical Oceanography. (3) Prerequisites, consent of the instructor. Historical review of oceanography; physical, chemical, stratification and circulation properties of the ocean; dynamics of frictionless, frictional, wind driven and thermohaline circulations; air-sea interactions.

ENME 453 Ocean Waves, Tides and Turbulences. (3) Prerequisite, METO 420 or consent of instructor. Introduction to the theory of oceanic wave motions, tides, wind waves, swells, storm surges, seiches, tsunamies, internal waves, turbulence, stirring, mixing and diffusion.

ENME 460 Elasticity and Plasticity I. (3) Three lectures a week. Prerequisite, ENME 400. Analysis of plates and shells, thick walled cylinders, columns, torsion of non-circular sections, and rotating disks.

ENME 461 Dynamics II. (3) Three lectures a week. Prerequisites, ENME 360, differential equations, senior standing in mechanical engineering. Linear and non-linear plane and three-dimensional motion, moving axes, Lagrange's equation, Hamilton's principle, non-linear vibration, gyroscope, celestial mechanics.

ENME 462 Introduction to Engineering Acoustics. (3) Three lectures per week. Prerequisite, ENME 380 or equivalent. Study of the physical behavior of sound waves. Introduction to terminology and instrumentation used in acoustics. Criteria for noise and vibration control. Some fundamentals underlying noise control and applications to ventilation systems, machine and shop quieting, office buildings, jet noise, transportation systems and underwater sound.

ENME 463 Mechanical Engineering Analysis. (3) Three lectures a week. Prerequisite, ENME 380, or MATH 246. Mathematical modeling of physical situations. Solution of problems expressed by partial differential equations. Application of Fourier series and integrals, La Place transformation, Bessel functions, Legendre polynomials and complex variables to the solution of engineering problems in mechanical vibrations, heat transfer, fluid mechanics and automatic control theory.

ENME 465 Introductory Fracture Mechanics. (3) Three lectures per week. Prerequisite, senior standing in engineering. An examination of the concepts of fracture in members with pre-existing flaws. Emphasis is primarily on the mechanics aspects with the development of the Griffith theory and the

introduction of the stress intensity factor, K, associated with different types of cracks. Fracture phenomena are introduced together with critical values of the fracture toughness of materials. Testing procedures for characterizing materials together with applications of fracture mechanics to design are treated.

ENME 480 Engineering Experimentation. (3) One lecture and two laboratory periods a week. Prerequisite, senior standing in mechanical engineering. Theory of experimentation. Applications of the principles of measurement and instrumentation systems to laboratory experimentation. Experiments in fluid mechanics, solid mechanics and energy conversion. Selected experiments or assigned projects to emphasize planned procedure, analysis and communication of results, analogous systems and leadership.

ENME 481 Engineering Experimentation. (3) One lecture and two laboratory periods a week. Prerequisite, senior standing in mechanical engineering. Theory of experimentation. Applications of the principles of measurement and instrumentation systems to laboratory experimentation. Experiments in fluid mechanics, solid mechanics and energy conversion. Selected experiments or assigned projects to emphasize planned procedure, analysis and communication of results, analogous systems and leadership.

ENME 488 Special Problems. (3) Three lectures a week. Prerequisite, senior standing in mechanical engineering. Advanced problems in mechanical engineering with special emphasis on mathematical and experimental methods.

ENME 489 Special Topics in Mechanical Engineering. (3) Prerequisite, permission of instructor. May be taken for repeated credit up to a total of 6 credits, with the permission of the student's advisor. Selected topics of current importance in mechanical engineering.

ENME 518 Mechanical Engineering Professional Elective. (2) Prerequisite, B.S. in engineering or consent of instructor. Subjects as announced. Current topics or recent development of interest to the practicing engineer. Not applicable towards a graduate degree.

Engineering, Nuclear

ENNU 215 Introduction to Nuclear Technology. (3) Prerequisites, MATH 141 and PHYS 161. Engineering problems of the nuclear energy complex, including basic theory, use of computers, nuclear reactor design and isotopic and chemical separations.

ENNU 310 Environmental Aspects of Nuclear Energy. (3) Protection of the public and the environment from the hazards of nuclear operations. Radiation monitoring, handling and disposal of radioactive wastes. Site selection, plant design and operation as related to the environment.

ENNU 320 Nuclear Reactor Operation. (3) Introduction to nuclear reactor operations. Outline of reactor theory. Nature and monitoring techniques of ionizing radiation, radiation safety. Reactor instrument response. Operation of the University of Maryland nuclear reactor.

ENNU 430 Radioisotope Power Sources. (3) Prerequisite, ENNU 215 or permission of instructor. Principles and theory of radioisotope power sources. Design and use of nuclear batteries and small energy conversion devices.

ENNU 435 Activation Analysis. (3) Prerequisite, ENNU 215 or permission of instructor. Principles and techniques of activation analysis involving neutrons, photons and charged particles. Emphasis placed upon application of this analytical technique to solving environmental and engineering problems.

ENNU 400 Nuclear Technology Laboratory. (3) One lecture and two laboratory periods a week. Prerequisites, MATH 240, PHYS 263. Techniques of detecting and making measurements of nuclear or high energy radiation. Radiation safety experiments. Both a sub-critical reactor and the swimming pool critical reactor are sources of radiation.

ENNU 450 Nuclear Reactor Engineering I. (3) Prerequisites, MATH 246 and PHYS 263 or consent of instructor. Elementary nuclear physics, reactor theory, and reactor energy transfer. Steady-state and time-dependent neutron distributions in space and energy. Conduction and convective heat transfer in nuclear reactor systems.

ENNU 455 Nuclear Reactor Engineering II. (3) Prerequisite, ENNU 450. General plant design considerations including radiation hazards and health physics, shielding design, nuclear power economics, radiation effects on reactor materials, and various types of nuclear reactor systems.

ENNU 460 Nuclear Heat Transport. (3) Prerequisite, ENNU 450. Heat generation in nuclear reactor cores, conduction and transfer to coolants. Neutron flux distributions, fission and heat release. Steady and unsteady state conduction in fuel elements. Heat transfer to nonmetallic and metallic coolants. Heat transfer with phase change. Thermal design of reactor cores.

ENNU 468 Research. (2-3) Prerequisite, permission of the staff. Investigation of a research project under the direction of one of the staff members. Comprehensive reports are required. Repeatable to a maximum of six semester hours.

ENNU 470 Introduction to Controlled Fusion. (3) Prerequisite, senior standing in engineering or consent of instructor. The principles and the current status of research to achieve controlled thermonuclear power production. Properties of ionized gases relating to confinement and heating. Concepts of practical fusion devices.

ENNU 480 Reactor Core Design. (3) Prerequisite, ENNU 450 or consent of instructor. Design of nuclear reactor cores based on a sequence of standard computer codes. Thermal and epithermal cross sections, multigroup diffusion theory in one and two dimensions and fine structure flux calculations using transport theory.

ENNU 490 Nuclear Fuel and Power Management. (3) Prerequisites, ENNU 460 and 480, or consent of instructor. Physics and economics of the nuclear fuel cycle utilizing existing design codes. Mining, conversion, enrichment, fabrication, reprocessing processes. Effects of plutonium recycle, in-core shuffling, fuel mechanical design and power peaking on fuel cycle costs.

Entomology

ENTM 100 Insects. (3) A survey of the major groups of insects, their natural history, and their relationships with man and his environment.

ENTM 111 Beekeeping. (2) First semester. A study of the life history, behavior and seasonal activities of the honeybee. Its place in pollination of flowers with emphasis on plants of economic importance and bee lore in literature.

ENTM 204 General Entomology. (4) Three lectures and one two-hour laboratory period a week. Prerequisite, one semester of a college level biology course. The position of insects in the animal kingdom, their classification, anatomy, embryology, physiology, behavior, ecology and economic importance. All the orders and some important families are studied. A collection of insects is required.

ENTM 252 Agricultural Insect Pests. (3) Two lectures and one two-hour laboratory period a week. Prerequisite, BOTN 100 or ZOOL 101. An introduction to the principal insect pests of fruit, vegetable, forage, and ornamental crops, with special reference to Maryland agriculture. Not open to entomology majors.

ENTM 351 Introduction to Insect Population Management. (3) Three lecture periods a week. An introduction to the theory and practice of management of insect populations. The course explores the development of all insect pest population suppression methods, as well as the management of insect populations beneficial to man. The main theme of the course is how man can manipulate environmental components for the purpose of population regulation of insects, and the beneficial and harmful effects of these manipulations.

ENTM 399 Special Problems. (1-3) Credit and prerequisites to be determined by the department. Investigations of assigned entomological problems.

ENTM 407 Entomology for Science Teachers. (4) Summer. Four lectures and four three-hour laboratory periods a week. This course will include the elements of morphology, taxonomy and biology of insects using examples commonly available to high school teachers. It will include practice in collecting, preserving, rearing and experimenting with insects insofar as time will permit.

ENTM 412 Advanced Apiculture. (3) One lecture and two three-hour laboratory periods a week. Prerequisite, ENTM 111. The theory and practice of apiary management. Designed for the student who wishes to keep bees or requires a practical knowledge of bee management.

ENTM 421 Insect Taxonomy and Biology. (4) Two lectures and two three-hour laboratory periods a week. Prerequisite, ENTM 200. Introduction to the principles of systematic entomology and the study of all orders and the important families of insects; immature forms considered.

ENTM 432 Insect Morphology. (4) Two lectures and two three-hour laboratory periods a week. Prerequisite, ENTM 200. A basic study of insect form, structure and organization in relation to function.

ENTM 442 Insect Physiology. (4) Prerequisites, ENTM 200 and CHEM 104 or equivalent. Three lectures and one three-hour laboratory per week. Functions of internal body systems in insects.

ENTM 451 Economic Entomology. (4) Two lectures and two two-hour laboratory periods a week. Prerequisite, ENTM 200. The

recognition, biology and control of insects injurious to fruit and vegetable crops, field crops and stored products.

ENTM 452 Insecticides. (2) Prerequisite, consent of the department. The development and use of contact and stomach poisons, fumigants and other important chemicals, with reference to their chemistry, toxic action, compatibility, and host injury. Recent research emphasized.

ENTM 453 Insect Pests of Ornamental Plants. (3) Prerequisite, ENTM 200. Two lectures and one three-hour laboratory period a week. The recognition, biology and control of insects and mites injurious to ornamental shrubs, trees and greenhouse crops. Emphasis is placed on the pests of woody ornamental plants.

ENTM 462 Insect Pathology. (3) Two lectures and one three-hour laboratory period per week. Prerequisite, MICB 200, prerequisite or corequisite, ENTM 442 or consent of the instructor. An introduction to the principal insect pathogens with special reference to symptomology, epizootiology, and microbial control of insect pests.

ENTM 472 Medical and Veterinary Entomology. (4) Three lectures and one two-hour laboratory period a week. Prerequisite, ENTM 200 or consent of the department. A study of the morphology, taxonomy, biology and control of the arthropod parasites and disease vectors of man and animals. The ecology and behavior of vectors in relation to disease transmission will be emphasized.

ENTM 498 Seminar. (1) Prerequisite, senior standing. Presentation of original work, reviews and abstracts of literature.

Engineering Technology, Fire Service

ETFS 301 Fire Safety Codes and Standards. (3) Two lectures and one laboratory period a week. A comparative and contrasting analysis of fire safety legislation codes and standards. The current and potential impact of regulatory provisions on urban fire safety. Criteria for the development, adoption, implementation and enforcement of selected types of legislation.

ETFS 302 Urban Fire Safety Analysis I. (3) Two lectures and one laboratory period a week. An examination of public fire safety organization in relation to paradigms of public administration. A systems structure of organizations provides the framework for analyzing public fire safety relative to administrative and management functions. Evaluation of the developed public fire safety system in terms of public choice alternative and economies of scale.

ETFS 303 Urban Fire Safety Analysis II. (3) Prerequisite, ETFS 302. Two lectures and one laboratory period a week. A synthesizing course on alternative arrangements for establishing defined levels of public fire safety. The planning decision system utilizes role playing techniques. Analysis and modification of elements affecting urban fire safety.

ETFS 402 Fire Safety Research and Transfer. (3) Two lectures and one laboratory period a week. An evaluation of scope and methods utilized to accomplish technological transfer of scientific finding to the application of problem situations in public fire safety. An examination of ongoing and reported research.

ETFS 405 Technical Problem Analysis. (3) Two lectures and one laboratory period a week. Prerequisites, 12 hours of upper division courses in fire science. The development of student awareness and competency relating to concepts of research analysis. Each student develops a research design and carries out a study project. Individual studies are culminated with a project paper.

Engineering Technology, Mechanical Engineering

ETME 200 Designing with Materials. (3) Two lectures and one laboratory per week — concurrent with ETTS 200. Basic properties of engineering materials applied to design of industrial products.

ETME 210 Applied Thermodynamics. (3) Three lectures per week. Prerequisites, MATH 221 and CHEM 103. Fundamental concepts. First and second laws of thermodynamics for control volumes and fixed-mass systems. Properties of liquids, vapors and gases. Applications to Carnot, Otto, diesel and Rankine power cycles.

ETME 315 Heat Transfer Technology. (3) Three lectures per week. Prerequisite, ETME 320. Heat transfer by conduction, free or forced convection and radiation. Concepts of dimensional analysis and similarity applied to transfer processes. Application of basic principles to the design of heat transfer equipment.

ETME 320 Fluid Mechanics Technology. (3) Three lectures per week. Corequisite, ETME 210 or equivalent. Corequisite ENME 343. Fluid properties, hydrostatic pressure, forces and moments in floating and submerged objects. Energy and momentum conservation principles for the flow of incompressible fluids. Similarity, dimensional analysis and model testing. One-dimensional flow, pipe friction and losses in fittings. Fluid meters and instrumentation.

ETME 325 Instrumentation and Measurements. (4) Two lectures per week, one laboratory and one recitation. Prerequisite, EDIN 247 or equivalent. Fundamental concepts of mechanical and electronic measurement of distance, velocity, acceleration, time, pressure, force, strain. Introduction to development of measuring systems and calibration of these systems. Application of measuring systems to industrial technology.

ETME 330 Machine Design Technology I. (3) Three lectures per week. Prerequisites, ETTS 220 and 221 or equivalent. Stresses and deflection in machine members. Power transmission: shafts, couplings, kays, clutches and brakes. Fastening: threaded fasteners, bolts, rivets and welding. Lubrication, sleeve bearings and roller bearings.

ETME 335 Machine Design Technology II. (3) Two lectures and one laboratory per week. Prerequisite, ETME 330. Design of mechanisms. Linkages, connectors, cams and toothed gearing. Gear types and production methods. Intermittent motion mechanisms. Kinematics and dynamics of machinery. Velocities and accelerations, static and inertia forces in machine elements. Machine analysis and design project.

ETME 345 Vibrations. (3) Three lectures per week. Prerequisite, a course in differential equations. Single and multi-degree-of-freedom systems. Free and forced vibrations. Damping and resonance. Energy method, Rayleigh method and mechanical impedance method. Balancing and dynamic vibration absorber. Electrical analogies and analog computer.

ETME 350 Mechanical System Design. (3) Two lectures and one laboratory period per week. Prerequisites, ETME 315 and ETME 335. The design process: creativity, analysis, synthesis and decision-making. Application of analytical techniques and experimental results. Individual or group design projects emphasizing the synthesis of a design solution to meet performance specifications.

ETME 352 Components of Control Systems. (3) Three lectures per week. Prerequisites, a course in differential equations and ETME 325. Principles of feedback control systems. Dynamic behavior of typical processes, transducers and controlled systems. Mechanical, electromechanical and fluid power control system components. Numerical control of machine tools. Digital and analog simulation of system performance and stability.

ETME 355 Mechanical System Design Project. (3) One lecture and two laboratory periods per week. Prerequisite, ETME 350. Individual or group design projects requiring the synthesis of analytical, experimental and manufacturer's data for the development of a mechanical system. Execution of design in sufficient detail to permit construction and texting or evaluation of a prototype, model, or mock-up. Consideration of reliability, safety, human factors and economics of production.

ETME 357 Applied Stress Analysis. (3) Three lectures per week. Prerequisites, ETTS 220, ENME 380, ENES 240, ENES 243. A continuation of the course ETTS 220; however, emphasis is placed on computing stresses in machine components. Major topics include shafts in bending, short deep beams, torsion of non-circular sections, rotating disks, thick-walled pressure vessels, and theories of failure. Energy methods and numerical procedures are introduced to solve specific problems.

ETME 360 Applications of Direct Energy Conversion. (3) Three lectures per week. Prerequisite, ETME 315. Review of thermodynamic energy conversion processes. Basic concepts for solid state energy conversion processes. Applications to the operation of thermoelectric, thermionic, magnetohydrodynamic photovoltaic and fuel cell energy conversion systems.

ETME 362 Air Conditioning and Refrigeration Systems. (3) Three lectures per week. Prerequisite, ETME 315. Thermodynamic analysis of typical cycles for air conditioning and refrigeration systems. Calculation of heating and cooling loads. Equipment characteristics for typical systems.

ETME 367 Power Plant Design and Operation. (3) Three lectures per week. Prerequisite, ETME 315. Analysis and design of components of steam power plants such as boilers, turbines, condensers and pumps. Nuclear reactors as heat sources. Economic and environmental considerations in plant design.

ETME 369 Internal Combustion Engine Design and Performance. (3) Three lectures per week. Prerequisites, ETME 210 and ETME 320. Air-standard cycle analysis. Combustion processes. Engine components, carburetion,

valves, ignition systems and combustion chambers. Knock and knock rating, engine performance characteristics. Emission control.

ETME 370 Industrial Engineering Technology. (3) Three lectures per week. Prerequisite, EDIN 262 or consent of instructor. Principles of industrial and laboratory organization. Economics of production, capital equipment, labor costs, cost of materials. Industrial plant siting, environmental considerations, plant layout and design. Engineering decisions for production, methods analysis, value analysis quality control. Industrial relations.

ETME 375 Applied Operations Research. (3) Three lectures per week. Prerequisite, MATH 221. Problem formulation and model construction. Allocation problems. Applications to inventory, production, replacement, reliability and maintenance requirements. Queuing problems. Applications to sequencing, coordination and routing operations for manufacturing plants and laboratories.

Engineering Technology, Technological Science

ETTS 110 Applied Statics. (3) Prerequisite, MATH 110. Systems of rigid bodies in equilibrium under action of forces and couples. Numerical, graphical, and vectorial computations are used in the solution of practical problems in statics.

ETTS 120 Manufacturing Processes and Materials. (3) Manufacturing processes and materials, including casting, machining, forming, stamping, extruding, welding and cutting, bonding, finishing, heat treatment, equilibrium diagrams, ferrous and non-ferrous materials.

ETTS 220 Applied Strength of Materials. (3) Prerequisites, MATH 111 and ETTS 110. Distortion of engineering materials in relation to changes in stress or temperature. Geometry of internal strain and external displacement. Application to beams, columns, shafts, tanks and other structural machines and vehicle members.

ETTS 221 Applied Dynamics. (3) Prerequisites, MATH 111 and ETTS 110. Systems of heavy particles and rigid bodies at rest and in motion. Rectilinear motion, curvilinear motion, rotation, plane motion, work, energy, power, impulse and momentum.

Food Science

FDSC 111 Contemporary Food Industry and Consumerism. (3) Three lecture hours per week. The role of the food processing industry in attempting to satisfy man's need for food. Food quality: nutritional, sensory, and compositional; conventional vs 'natural' organic foods; preservation and spoilage — role of chemical additives; synthetic and convenience foods; consumer protection; the food industry and the environment; future food sources.

FDSC 398 Seminar. (1) Presentation and discussion of current literature and research in food science.

FDSC 399 Special Problems in Food Science. (1-3) Prerequisite, approval of staff. Designed for advanced undergraduates in which specific problems in food science will be assigned. Four credit maximum per student.

FDSC 412 Principles of Food Processing I. (3) Two lectures and one laboratory per week. A study of the basic methods by which foods are preserved (unit operations). Effect of raw product quality and the various types of processes on yield and quality of the preserved products.

FDSC 413 Principles of Food Processing II. (3) Three lectures per week. A detailed study of food processing with emphasis on line and staff operations, including physical facilities, utilities, pre- and post-processing operations, processing line development and sanitation.

FDSC 421 Food Chemistry. (3) Three lectures per week. Prerequisites, CHEM 203 and 204. The application of basic chemical and physical concepts to the composition and properties of foods. Emphasis on the relationship of processing technology to the keeping quality, nutritional value, and acceptability of foods.

FDSC 422 Food Product Research and Development. (3) Two lectures, and one laboratory per week. Prerequisites, FDSC 413, CHEM 461, or permission of instructor. A study of the research and development function for improvement of existing products and development of new, economically feasible and marketable food products. Application of chemical-physical characteristics of ingredients to produce optimum quality products, cost reduction, consumer evaluation, equipment and package development.

FDSC 423 Food Chemistry Laboratory. (2) Pre- or corequisite, FDSC 421. Two laboratories per week. Analysis of the major and minor constituents of food using chemical, physical and instrumental methods in concordance with current food industry and regulatory practices. Laboratory exercises coincide lecture subjects in FDSC 421.

FDSC 430 Food Microbiology. (2) Two lectures per week. Prerequisite, MICB 200 or equivalent. A study of microorganisms of major importance to the food industry with emphasis on food-borne outbreaks, public health significance, bioprocessing of foods and control of microbial spoilage of foods.

FDSC 431 Food Quality Control. (4) Three lectures and one laboratory per week. Definition and organization of the quality control function in the food industry; preparation of specifications; statistical methods for acceptance sampling; in-plant and processed product inspection. Instrumental and sensory methods for evaluating sensory quality, identity and wholesomeness and their integration into grades and standards of quality.

FDSC 434 Food Microbiology Laboratory. (2) Two laboratories per week. Pre- or corequisite, FDSC 430. A study of techniques and procedures used in the microbiological examination of foods.

FDSC 442 Horticultural Products Processing. (3) Two lectures and one laboratory per week. Commercial methods of canning, freezing, dehydrating, fermenting, and chemical preservation of fruit and vegetable crops.

FDSC 451 Dairy Products Processing. (3) Two lectures and one laboratory per week. Method of production of fluid milk, butter, cheese, condensed and evaporated milk and milk products and ice cream.

FDSC 461 Technology of Market Eggs and Poultry. (3) Two lectures and one laboratory per week. A study of the technological factors concerned with the processing, storage, and marketing of eggs and poultry and the factors affecting their quality.

FDSC 471 Meat and Meat Processing. (3) Two lectures and one laboratory a week. Prerequisite, CHEM 461 or permission of instructor. Physical and chemical characteristics of meat and meat products, meat processing, methods of testing and product development.

FDSC 482 Seafood Products Processing. (3) Two lectures and one laboratory a week. Prerequisite, CHEM 461 or permission of instructor. The principal preservation methods for commercial seafood products with particular reference to the invertebrates. Chemical and microbiological aspects of processing are emphasized

Family and Community Development

FMCD 105 The Individual in the Family. (3) Study of self-concept development and self awareness through examination of developmental theories and their application within the family context.

FMCD 201 Concepts in Community Development. (3) Examination of the community within society and the individual and family within the community. Models for community intervention and service delivery for the solution of individual and family problems.

FMCD 250 Decision Making in Family Living. (3) Decision making in relation to family values, philosophies, goals, and resources, and general socio-economic conditions.

FMCD 260 Interpersonal Life Styles. (3) Socialization toward marriage and contemporary life-style patterns in interpersonal relations.

FMCD 270 Pre-Professional Seminar. (3) Survey of professional opportunities, responsibilities and trends in each departmental area of emphasis. Concentration will be on the development of personal qualities and professional ethics essential for effective occupational performance.

FMCD 280 The Household as an Ecosystem. (3) The input of air, water, energy and other resources and the output of household pollutants as influences on the choices of equipment for such household processes as food preparation, laundry, and floor care.

FMCD 330 Family Patterns. (3) Prerequisites, FMCD 260 and PSYC 100. A study of family patterns within the sub-cultures of America and various other cultures. Emphasis will be given to those patterns and life styles which evolve as adaptations to cultural demands.

FMCD 332 The Child in the Family. (3) Prerequisite, PSYC 100 or SOCY 100. Study of the child from prenatal stage through adolescence, with emphasis on responsibility for guidance in the home. Biological and psychosocial needs as they affect the child's relationship with his family, peers, and society.

FMCD 341 Personal and Family Finance. (3) Study of individual and family finances with particular emphasis upon financial planning, savings, insurance, investments, income taxes, housing, and use of credit.

FMCD 343 Applied Home Management. (3) An alternate for FMCD 344, this course provides an opportunity for the student who is currently managing his or her own home to meet objectives similar to those stated for FMCD 344.

FMCD 344 Resident Experience in Home Management. (3) Four to nine weeks. Prerequisite, FMCD 250. Group living and

management experience providing opportunity to examine decision patterns, participate in group decision making and analyze value systems and resource utilization which differ from the student's own. (Each student pays $60 which is used for food and supplies. The University housing office bills non-dormitory students for room rent at the rate of $5 per week.)

FMCD 348 Practicum in Family and Community Development. (3-12) Prerequisites, FMCD 270 plus 6 credits of practicum related coursework. For FMCD majors only. Pre-application required. A planned, supervised practicum to complement classroom instruction. To be carried concurrently with FMCD 349, analysis of practicum. Maximum total of 12 credits allowed towards degree requirements.

FMCD 349 Analysis of Practicum. (1-2) For FMCD majors only. Weekly seminars for students concurrently carrying FMCD 348. Opportunities to integrate theory and practice. Two credits for the first semester and one credit every semester thereafter for a maximum total of five credits.

FMCD 370 Communication Skills and Techniques. (3) Provides training in communication skills relevant to interpersonal situations, i.e., dating, marriage and family life. Relevant communication concepts, principles and models are discussed and demonstrated.

FMCD 381 Low-Income Families and the Community. (3) Interrelationships between the community social system and the behavior patterns of low income families using the theoretical and applied perspective of human ecology.

FMCD 431 Family Crises and Rehabilitation. (3) Deals with various types of family crisis situations and how families cope with the rehabilitation process. It covers issues at various stages of the family cycle ranging from divorce, teenage runaways, abortion, to the effect of death on a family. Role playing and interviewing techniques are demonstrated and ways of helping the family through the crises are emphasized.

FMCD 443 Consumer Problems. (3) Consumer practices of American families. Merchandising practices as they affect the consumer. Organizations and laws in the interest of the consumer.

FMCD 446 Living Experiences with Families. (3-6) A — Domestic Intercultural. B — International Intercultural. Prerequisites, FMCD 330, ANTH 101, FMCD 250; optional, language competence. An individual experience in living with families of a sub-culture within the U.S. or with families of another country, participating in family and community activities. A foreign student may participate and live with an American family.

FMCD 447 Home Management for the Disabled. (3) Application of home management concepts in the use of resources to promote maintenance of homemaker independence through physiological and psychological adjustments in the family and home environment. The purpose of this course is to prepare students for working effectively with disabled homemakers.

FMCD 448 Selected Topics in Home Management. (3) Seminar format will be used to examine the ways families set priorities and organize their efforts and resources to achieve both social and economic goals. Prior registration in FMCD 250, 341, or other courses in management theory, systems analysis or research methods is desirable. Repeatable for a maximum of 6 credits provided subject matter is different.

FMCD 453 Family-Community Advocacy. (3) Legislative efforts, state and federal, which have impact on families. The techniques, tactics, and strategies of lobbyists.

FMCD 485 Introduction to Family Counseling. (3) Provides the fundamental theoretical concepts and clinical procedures that are unique to marital and family therapy. These techniques are contrasted with individually-orientated psychotherapy. Pre-marital, marital and family, and divorce counseling techniques are demonstrated and evaluated.

FMCD 487 Legal Aspects of Family Problems. (3) Laws and legal involvement that directly affect specific aspects of the family: adoption, marriage, estate planning, property rights, wills, etc. Emphasis will be given to the involvement of a professional lawyer; principles and interpretation of the law.

FMCD 499 Special Topics. (1-3) A — Family Studies. B — Community Studies. C — Management and Consumer Studies.

Food

FOOD 105 Professional Orientation. (1) A series of lectures introducing the student to the broad field of careers in food, nutrition, dietetics, and institution administration. Includes trends, role of related sciences, educational and personal requirements, ethics, and opportunities in each professional area.

FOOD 110 Food and Nutrition of Individuals and Families. (3) Two lectures and one two-hour laboratory period a week. A study of food in contemporary living. The economic, social and esthetic implications of food as well as its nutritive value. Selection and use of food in relation to eating habits, health and well-being of the individual. Survey of meal preparation and service applied to family situations. Credit will be given for only one course: NUTR 100 or FOOD 110.

FOOD 200 Scientific Principles of Food. (3) Prerequisite, NUTR 100. Two lectures and one two-hour laboratory period a week. Study of basic scientific principles as applied to food preparation processes. For nondepartmental majors.

FOOD 240 Science of Food Preparation I. (3) One lecture and two two-hour laboratory periods a week. Prerequisites, NUTR 100, and CHEM 104 or concurrent registration. Composition and structure of food with study of the fundamental principles involved in food preparation. Especially designed for majors in food, nutrition and institution administration.

FOOD 250 Science of Food Preparation II. (3) One lecture and two two-hour laboratory periods a week. Prerequisite, FOOD 240. A continuation of FOOD 240.

FOOD 260 Meal Management. (3) Two lectures and one three-hour laboratory a week. Prerequisites, FOOD 200 or 240. Retail selection of food commodities in relation to levels of spending; management of family meals through organization of available resources.

FOOD 300 Economics of Food Consumption. (3) Prerequisites, ECON 201 or 205; and FOOD 110 or NUTR 100. Interrelations of food, population and economic progress; trends in food consumption patterns; world and local food problems.

FOOD 440 Advanced Food Science. (3) Three lectures per week. Prerequisites, FOOD 250 and CHEM 261 or 461. Chemical and physical properties of food as related to consumer use in the home and institutions.

FOOD 445 Advanced Food Science Laboratory. (1) One three-hour laboratory per week. Prerequisite, CHEM 201 and consent of instructor. Chemical determination of selected components in animal and plant foods.

FOOD 450 Experimental Food Science. (3) One lecture, two laboratories per week. Prerequisite, FOOD 440 or equivalent. Individual and group laboratory experimentation as an introduction to methods of food research.

FOOD 480 Food Additives. (3) Prerequisite, FOOD 440 or equivalent. Effects of intentional and incidental additives on food quality, nutritive value and safety. Current regulatory procedures.

FOOD 490 Special Problems in Foods. (2-3) Prerequisite, FOOD 440 and consent of instructor. Individual selected problems in the area of food science.

FOOD 498 Special Topics. (1-3) Prerequisite, consent of instructor. Selected current aspects of food. Repeatable to a maximum of six credits if the subject matter is substantially different.

Foreign Language

FOLA 001 English for Foreign Students. (3) An introduction to English usage, adapted to the needs of the non-English-speaking student. Pronunciation, spelling, syntax, vocabulary, the difference between English and various other languages are stressed. Reading of modern American short stories. This course does not carry credit towards any degree at the University.

FOLA 002 English for Foreign Students. (3) An introduction to English usage, adapted to the needs of the non-English-speaking student. Pronunciation, spelling, syntax, vocabulary, the difference between English and various other languages are stressed. Reading of modern American short stories. This course does not carry credit towards any degree at the University.

FOLA 408 Foreign Language I. (3) Intensive study of a foreign language or related topic not available under one of the current foreign language departments or programs. May not be used to fulfill the arts and humanities language requirement.

FOLA 409 Foreign Language II. (3) Prerequisite, FOLA 408 in the same language or topic. A continuation of FOLA 408. May not be used to fulfill division of arts and humanities language requirement.

French

FREN 101 Elementary French. (4) Introduction to basic structures and pronunciation. Four recitations per week plus one laboratory hour.

FREN 102 Elementary French. (4) Completion of basic structures with emphasis on reading and speaking skills. Four recitations per week plus one laboratory hour.

FREN 103 Review of Elementary French. (4) Limited to students who have had at least two years of high school French (or equivalent) or

who do not qualify for FREN 104. Four recitations per week plus one hour of laboratory.

FREN 104 Intermediate French. (4) Grammar review with extended reading, discussion, and composition. Four recitations per week plus one laboratory hour. Fulfills the language requirement.

FREN 111 Elementary French. (3) Given as intensive course in summer session. Three recitations and one drill per week. Study of spoken and written language and development of the four language skills.

FREN 112 Elementary French. (3) Given as intensive course in summer session. Three recitations and one drill per week. Study of spoken and written language and development of the four language skills.

FREN 113 Review of Elementary French. (3) Two recitations and two audio-lingual drills per week, or three recitations and one audio-lingual drill, depending on circumstances. Enrollment limited to students who, having taken placement examination, have failed to qualify for FREN 114.

FREN 114 Intermediate French. (3) Three recitations per week. Given as intensive course in summer session. Prerequisite, FREN 112 or equivalent or FREN 113. Study of linguistic structures, further development of audio-lingual and writing ability, and reading of literary texts with discussion in French.

FREN 115 Intermediate French. (3) Three recitations per week. Given as intensive course in summer session. Prerequisite, FREN 112 or equivalent or FREN 113. Study of linguistic structures, further development of audio-lingual and writing ability, and reading of literary texts with discussion in French.

FREN 121 Accelerated French I. (3) An intensive beginning course in French language skills: guided practice in reading and writing, understanding the spoken language and conversation, to enable the student to move more quickly to advanced courses. Enrollment restricted to students already having a good background in at least one other foreign language (successful completion of level 4 in high school, or of 115 or 104 or equivalent at the university level; or through linguistic competence acquired by residence abroad, or by demonstration of equivalent proficiency). With 122, may be used to satisfy language requirements.

FREN 122 Accelerated French II. (3) Prerequisite, FREN 121. An intensive beginning course in French language skills: guided practice in reading and writing, understanding the spoken language and conversation, to enable the student to move more quickly to advanced courses. May be used to satisfy language requirements.

FREN 201 Review Grammar and Composition. (3) Prerequisite, FREN 104 or 115, or course chairman's consent. An intensive review of major aspects of contemporary grammatical usage; training in comprehension; an introduction to guided composition.

FREN 211 Phonetics and Spoken French. (3) Prerequisite, FREN 104 or 115, or course chairman's consent. Not open to native speakers of French. Introduction of the French phonetic system, with practice in the spoken language; international phonetic alphabet; intonation.

FREN 231 Aspects of French Civilization. (3) A general introduction to the geographical, historical and cultural forces that have fashioned modern French institutions. No knowledge of French required. No prerequisites.

FREN 251 French Literature from the Revolution to the Present. (3) Masterworks of French literature placed in their historical perspective by means of a weekly master-lecture (in French), and closely analyzed in twice-weekly small discussion groups (in English or French).

FREN 252 French Literature from the Renaissance to the Revolution. (3) Prerequisite, FREN 251 or course chairman's consent. Masterworks of French literature placed in their historical perspective by means of a weekly master-lecture (in French), and closely analyzed in twice-weekly small discussion groups (in English or French).

FREN 279 Readings in French Literature in Translation. (3) Topic to be determined each semester. All readings, discussions and examinations in English. No prerequisites. Repeatable for a maximum of 6 credits

FREN 301 Composition and Style. (3) Prerequisite, FREN 201, or course chairman's consent. An introduction to the techniques of the dissertation generale; grammatical analysis; free composition.

FREN 302 Advanced Composition and Style. (3) Prerequisite, FREN 301 or course chairman's consent. Training in the art of translation; dissertation generale; analysis of the role of language in literature.

FREN 311 French Conversation: Contemporary Issues. (3) Vocabulary development to the level of the contemporary French press. Not open to native speakers of French.

FREN 312 French Conversation: Current Cultural Events. (3) Vocabulary development to the level of the contemporary French press. Not open to native speakers of French.

FREN 399 Directed Study in French. (1-3) Prerequisite, permission of department chairman. Intended for advanced undergraduates who wish to work on an individual basis with a professor of their choice. Open as elective to all students, but may not be counted toward French major. May be taken for one, two or three credits, according to nature and scope of work envisaged. May be taken more than once; however, only repeatable for a maximum of three credits. Grading method: satisfactory-fail only.

FREN 400 Applied Linguistics. (3) The nature of applied linguistics and its contribution to the effective teaching of foreign languages. Comparative study of English and French, with emphasis upon points of divergence. Analysis, evaluation and construction of related drills.

FREN 401 Introduction to Stylistics. (3) Prerequisite, FREN 302, or course chairman's consent. Comparative stylistic analysis; detailed grammatical analysis; translation.

FREN 404 Oral Practice for Teachers of French. (3) Prerequisites, FREN 311 and FREN 312, or consent of the instructor. Development of fluency in French, stress on correct sentence structure and idiomatic expression. Credit may not be applied toward the French major.

FREN 405 Explication de Textes. (3) Oral and written analysis of short literary works, or of excerpts from longer works chosen for their historical, structural, or stylistic interest, with the purpose of training the major to understand literature in depth and to make mature esthetic evaluations of it.

FREN 411 Introduction to Medieval Literature. (3) French literature from the ninth through the fifteenth century. La Chanson Epique, Le Roman Courtois, Le Lai; La Litterature Bourgeoise, Le Theatre, La Poesie Lyrique.

FREN 412 Introduction to Medieval Literature. (3) French literature from the ninth through the fifteenth century. La Chanson Epique, Le Roman Courtois, Le Lai; La Litterature Bourgeoise, Le Theatre, La Poesie Lyrique.

FREN 421 French Literature of the Sixteenth Century. (3) The Renaissance in France; Humanism, Rabelais, Calvin, the Pleiade, Montaigne, Baroque Poetry.

FREN 422 French Literature of the Sixteenth Century. (3) The Renaissance in France: Humanism, Rabelais, Calvin, the Pleiade, Montaigne, Baroque Poetry.

FREN 431 French Literature of the Seventeenth Century. (3) Descartes, Pascal, Corneille, Racine; the remaining great classical writers, with special attention to Moliere.

FREN 432 French Literature of the Seventeenth Century. (3) Descartes, Pascal, Corneille, Racine; the remaining great classical writers, with special attention to Moliere.

FREN 441 French Literature of the Eighteenth Century. (3) Development of philosophical and scientific movement; Montesquieu, Voltaire, Diderot, Rousseau.

FREN 442 French Literature of the Eighteenth Century. (3) Development of philosophical and scientific movement; Montesquieu, Voltaire, Diderot, Rousseau.

FREN 451 French Literature of the Nineteenth Century. (3) Drama and poetry from Romanticism to Symbolism; the major prose writers of the same period.

FREN 452 French Literature of the Nineteenth Century. (3) Drama and poetry from Romanticism to Symbolism; the major prose writers of the same period.

FREN 461 Studies in Twentieth Century Literature — The Early Years. (3) French poetry, theater and the novel during the age of Proust and Gide.

FREN 462 Studies in Twentieth Century Literature — Mid-Century Writers. (3) Modern French poetry, theater and the novel, with special emphasis on the literature of anxiety and existentialism.

FREN 463 Studies in Twentieth Century Literature — The Contemporary Scene. (3) French writers and literary movements since about 1950, with special emphasis on new forms of the novel and theater.

FREN 471 French Civilization I. (3) French life, customs, culture, traditions (800-1750).

FREN 472 French Civilization II. (3) French life, customs, culture, traditions (1750-present-day France).

FREN 478 Themes and Movements of French Literature in Translation. (3) Studies treatments of thematic problems or of literary or historical movements in French literature. Topic to be determined each semester. Given in English.

FREN 479 Masterworks of French Literature in Translation. (3) Treats the works of one or

more major French writers. Topic to be determined each semester. Given in English.

FREN 488 Pro-Seminar in a Great Literary Figure. (3) Each semester a specialized study will be made of one great French writer chosen from some representative literary period or movement since the Middle Ages. Repeatable for a maximum of six credits.

FREN 489 Pro-Seminar in Themes or Movements of French Literature. (3) Repeatable for a maximum of six credits.

FREN 491 Honors Reading Course, Poetry. (3) H — Honors, poetry. Supervised readings to be taken normally only by students admitted to the honors program.

FREN 492 Honors Reading Course, Novel. (3) H — Honors, novel. Supervised readings to be taken normally only by students admitted to the honors program.

FREN 493 Honors Reading Course, Drama. (3) H — Honors, drama. Supervised readings to be taken normally only by students admitted to the honors program.

FREN 494 Honors Independent Study. (3) H — Honors. Honors Independent Study involves guided readings based on an honors reading list and tested by a 6 hour written examination. Honors 494 and 495 are required to fulfill the departmental honors requirement in addition to two out of the following, 491H, 492H, 493H. Open only to students admitted to the departmental honors program.

FREN 495 Honors Thesis Research. (3) H — Honors. Honors Thesis Research involves the writing of a paper under the direction of a professor in this department and an oral examination. Honors 494 and 495 are required to fulfill the departmental honors requirement in addition to two out of the following, 491H, 492H, 493H. Open only to students admitted to the departmental honors program.

FREN 498 Special Topics in French Literature. (3) Repeatable for a maximum of six credits.

FREN 499 Special Topics in French Studies. (3) An aspect of French studies, the specific topic to be announced each time the course is offered. Repeatable for a maximum of 6 credits.

Geography

GEOG 100 Introduction to Geography. (3) An introduction to the broad field of geography as it is applicable to the general education student. The course presents the basic rationale of variations in human occupancy of the earth and stresses geographic concepts relevant to understanding world, regional and local issues.

GEOG 201 Introductory Physical Geography. (3) Examination of the basic concepts of physical geography including those involving landforms, climate, vegetation, soils, and mineral resources, and the interrelations between them.

GEOG 202 Introductory Cultural Geography. (3) Examination of the basic concepts of human geography such as those relating to geography of political, population, settlement, and cultural phenomena.

GEOG 203 Introductory Economic Geography. (3) A study of physical and economic factors that underlie production. The roles of climate, soils, and landforms; and geographic distribution of agricultural, power and mineral resources, and the nature and uses of cartographic materials.

GEOG 300 Introduction to Geographic Research and Writing. (3) Development of research methods in geography including the formulation of problem, the establishment of hypotheses, development of structures for testing hypotheses, and practice with forms of geographic presentation. Maps, quantitative and field methods will be used as appropriate.

GEOG 370 Cartography and Graphics Practicum. (3) One hour lecture and two two-hour laboratory periods a week. Techniques and problems of compilation, design and construction of various types of maps and graphics. Relationships between map making and modern methods of production and reproduction. Trips to representative plants. Laboratory work directed toward cartographic problems encountered in the making of non-topographic maps.

GEOG 372 Interpretation of Topographic Maps and Aerial Photographs. (3) Two hours of lecture and two hours of laboratory per week. Interpretation of aerial photographs with emphasis on the recognition of landforms of different types and man-made features. Study of vegetation, soil and other data that may be derived from aerial photographs. Types of aerial photographs and limitations of photo interpretation.

GEOG 376 Introductory Quantitative Methods in Geography. (3) Basic principles of quantitative analysis in the context of geographic methodology. The focus is on standard statistical procedures used in spatial analysis rather than on the mathematical basis of the tools. The nature of quantitative data and a range of both descriptive and analytical quantitative methods will be examined.

GEOG 380 Local Field Course. (3) Training in geographic field methods and techniques. Field observation of land use in selected rural and urban areas in eastern Maryland. One lecture per week with Saturday and occasional weekend field trips. Primarily for undergraduates.

GEOG 381 Field Study — Physical. (1)

GEOG 382 Field Study — Rural. (1)

GEOG 383 Field Study — Urban. (1)

GEOG 384 Field Study — Field Methods. (1)

GEOG 385 Scientific Methodology and History of Geography. (3) For undergraduate and graduate majors in geography. May be taken also by students with a minimum of nine hours in systematic and six hours in regional geography. A comprehensive and systematic study of the history, nature and basic principles of geographic thought; a critical evaluation of some of the important geographical works and methods of geographic research.

GEOG 400 Geography of North America. (3) An examination of the contemporary patterns of American and Canadian life from a regional viewpoint. Major topics include: the significance of the physical environment, resource use, the political framework, economic activities, demographic and socio-cultural characteristics, regional identification, and regional problems.

GEOG 402 Geography of Maryland and Adjacent Areas. (3) An analysis of the physical environment, natural resources, and population in relation to agriculture, industry, transport, and trade in the state of Maryland and adjacent areas.

GEOG 406 Historical Geography of North America Before 1800. (3) An analysis of the changing geography of the U.S. and Canada from pre-Columbian times to the end of the 18th century. Emphasis on areal variations and changes in the settlements and economies of Indian and Colonial populations. Areal specialization and the changing patterns of agriculture, industry, trade, and transportation. Population growth, composition and interior expansion. Regionalization.

GEOG 407 Historical Geography of North America After 1800. (3) An analysis of the changing geography of the U.S. and Canada from 1800 to the 1920's. Emphasis on the settlement, expansion and socio-economic development of the U.S., and comparisons with Canadian experience. Immigration, economic activities, industrialization, transportation and urbanization.

GEOG 410 Geography of Europe. (3) Agricultural and industrial development of Europe and present-day problems in relation to the physical and cultural setting of the continent and its natural resources.

GEOG 411 Historical Geography of Europe. (3) An analysis of the changing geography of Europe at selected periods from prehistoric times until the end of the 19th century, with particular emphasis on western Europe. Changing patterns of population, agriculture, industry, trade and transportation. Development of the nation-state. Impact of overseas expansion. Agricultural and industrial revolutions.

GEOG 415 Economic Resources and Development of Africa. (3) The natural resources of Africa in relation to agricultural and mineral production; the various stages of economic development and the potentialities of the future.

GEOG 420 Geography of Asia. (3) Lands, climates, natural resources, and major economic activities in Asia (except Soviet Asia). Outstanding differences between major regions.

GEOG 421 Economic and Political Geography of Eastern Asia. (3) Study of China, Korea, Japan, the Philippines; physical geographic setting, population, economic and political geography. Potentialities of major regions and recent developments.

GEOG 422 Cultural Geography of China and Japan. (3) Survey of geographical distribution and interpretation of cultural patterns of China and Japan. Emphasis on basic cultural institutions, outlook on life, unique characteristics of various groups. Trends of cultural change and contemporary problems.

GEOG 423 Economic and Political Geography of South and Southeast Asia. (3) Study of the Indian subcontinent. Farther India, Indonesia; physical geographic setting, population, economic and political geography. Potentialities of various countries and regions and their role in present Asia.

GEOG 431 Economic and Cultural Geography of Caribbean America. (3) An analysis of the physical framework, broad economic and historical trends, cultural patterns, and regional diversification of Mexico, Central America, the West Indies.

GEOG 432 Economic and Cultural Geography of South America. (3) A survey of natural environment and resources, economic development and cultural diversity of the South American republics, with emphasis upon problems and prospects of the countries.

GEOG 434 Historical Geography of the Hispanic World. (3) An examination of the social, economic, political and cultural geography of the countries of the Iberian peninsula and Latin America in the past with concentration on specific time periods of special significance in the development of these countries.

GEOG 435 Geography of the Soviet Union. (3) The natural environment and its regional diversity. Geographical factors in the expansion of the Russian state. The geography of agricultural and industrial production in relation to available resources, transportation problems, and diversity of population.

GEOG 437 Introduction to Regional Methods. (3) Inquiry into the evolution of regional methodology with specific reference to geographic problems. Critical analysis and evaluation of past and contemporary theories and a thorough examination of alternate regional methodologies. Application of quantitative and qualitative techniques of regional analysis and synthesis to traditional and modern regional geography emphasizing principles of regionalization.

GEOG 440 Geomorphology. (3) Study of major morphological processes, the development of land forms and the relationships between various types of land forms and land use problems. Examination of the physical features of the earth's surface and their geographic distributions.

GEOG 441 Regional Geomorphology. (3) Regional and comparative morphology with special emphasis upon Anglo-America.

GEOG 445 Climatology. (3) The geographic aspects of climate with emphasis on energy-moisture budgets, steady-state and non-steady-state climatology, and climatic variations at both macro- and micro-scales.

GEOG 446 Systematic and Regional Climatology. (3) Prerequisite, GEOG 445, or permission of instructor. Methodology and techniques of collecting and evaluating climatological information. A critical examination of climatic classifications. Distribution of world climates and their geographical implications.

GEOG 450 Cultural Geography. (3) Prerequisite, GEOG 201, 202, or consent of instructor. An analysis of the impact of man through his ideas and technology on the evolution of geographic landscapes. Major themes in the relationships between cultures and environments.

GEOG 451 Political Geography. (3) Geographical factors in national power and international relations: an analysis of the role of 'geopolitics' and 'geostrategy,' with special reference to the current world scene.

GEOG 452 Cultural Ecology. (3) Basic issues concerning the natural history of man from the perspective of the geographer. Basic components of selected behavioral and natural systems, their evolution and adaptation, and survival strategies.

GEOG 455 Urban Geography. (3) Origins of cities, followed by a study of elements of site and location with reference to cities. The patterns and functions of some major world cities will be analyzed. Theories of land use differentiation within cities will be appraised.

GEOG 456 The Social Geography of Metropolitan Areas. (3) A socio-spatial approach to man's interaction with his urban environment; the ways people perceive, define, behave in, and structure their cities and metropolitan areas. Spatial patterns of social activities as formed by the distribution and interaction of people and social institutions.

GEOG 457 Historical Geography of Cities. (3) The course is concerned with the urbanization of the United States and Canada prior to 1920. Both the evolution of the urban system across the countries and the spatial distribution of activities within cities will be considered. Special attention is given to the process of industrialization and the concurrent structuring of residential patterns among ethnic groups.

GEOG 459 Proseminar in Urban Geography. (3) A problems-oriented course for students with a background in urban geography using a discussion/lecture format. It will focus on a particular sub-field within urban geography each time it is taught taking advantage of the special interests of the instructor.

GEOG 460 Advanced Economic Geography I — Agricultural Resources. (3) Prerequisite, GEOG 201 or 203. The nature of agricultural resources, the major types of agricultural exploitation in the world and the geographic conditions. Main problems of conservation.

GEOG 461 Advanced Economic Geography II — Mineral Resources. (3) Prerequisite, GEOG 201 or 203. The nature and geographic distribution of the principal power, metallic and other minerals. Economic geographic aspects of modes of exploitation. Consequences of geographic distribution and problems of conservation.

GEOG 462 Water Resources and Water Resource Planning. (3) GEOG 201 or 203, or permission of instructor. Water as a component of the human environment. A systematic examination of various aspects of water, including problems of domestic and industrial water supply, irrigation, hydroelectric power, fisheries, navigation, flood damage reduction and recreation.

GEOG 463 Geographic Aspects of Pollution. (3) The impact of man on his environment and resultant problems. Examination of the spatial aspects of physical and socio-economic factors in air, water, and land pollution.

GEOG 465 Geography of Transportation. (3) The distribution of transport routes on the earth's surface, patterns of transport routes, the adjustment of transport routes and media to conditions of the natural environment, population centers and their distribution.

GEOG 466 Industrial Localization. (3) Factors and trends in the geographic distribution of the manufacturing industries of the world, analyzed with reference to theories of industrial location.

GEOG 470 History and Theory of Cartography. (3) The development of maps throughout history. Geographical orientation, coordinates and map scales. Map projections, their nature, use and limitations. Principles of representation of features on physical and cultural maps. Modern uses of maps and relationships between characteristics of maps and use types.

GEOG 471 Cartography and Graphics Practicum. (3)

GEOG 472 Problems of Cartographic Representation and Procedure. (3) Two hours lecture and two hours laboratory a week. Study of cartographic compilation methods. Principles and problems of symbolization, classification and representation of map data. Problems of representation of features at different scales and for different purposes. Place-name selection and lettering, stick-up and map composition.

GEOG 473 Problems of Map Evaluation. (3) Two hours lecture and two hours laboratory a week. Schools of topographic concepts and practices. Theoretical and practical means of determining map reliability, map utility, and source materials. Nature, status and problems of topographic mapping in different parts of the world. Non-topographic special use maps. Criteria of usefulness for purposes concerned and of reliability.

GEOG 490 Geographic Concepts and Source Materials. (3) A comprehensive and systematic survey of geographic concepts designed exclusively for teachers. Stress will be placed upon the philosophy of geography in relation to the social and physical sciences, the use of the primary tools of geography, source materials, and the problems of presenting geographic principles.

GEOG 498 Topical Investigations. (1-3) Independent study under individual guidance. Restricted to advanced undergraduate students with credit for at least 24 hours in geography and to graduate students. Any exception should have the approval of the head of the department.

GEOG 499 Undergraduate Research. (3) Directed regional or systematic study involving several subfields of geography, including cartographic presentation, and usually requiring field work, and leading to an undergraduate thesis.

Geology

GEOL 100 Introductory Physical Geology. (3) A study dealing primarily with the principles of dynamical and structural geology. Designed to give a general survey of the rocks and minerals composing the earth; the movement within it; and its surface features and the agents that form them.

GEOL 102 Historical and Stratigraphic Geology. (3) Prerequisite, GEOL 100. A study of the earth's history as revealed through the principles of stratigraphy and the processes of physical geology, with emphasis on the formations and the geologic development of the North American continent.

GEOL 110 Physical Geology Laboratory. (1) One laboratory a week. May be taken concurrently with or after successful completion of GEOL 100. The basic materials and tools of physical geology stressing familiarization with rocks and minerals and the use of maps in geologic interpretations.

GEOL 112 Historical Geology Laboratory. (1) One laboratory a week. Concurrent registration in GEOL 102 or consent of instructor is required. The use of geologic maps and fossils in the study of the physical and biological evolution of the earth.

GEOL 120 Environmental Geology. (3) A review of geologic factors underlying many environmental problems and the interactions between population and physical environment: geologic hazards, land-use planning, conservation, mineral resources, waste disposal, land reclamation and the geologic aspects of health and disease. The course is aimed at lower division students in education and liberal arts, and should be useful to any

student concerned with geologic perspectives of environmental problems.

GEOL 399 Research Problems in Geology. (1) Open only to geology majors in their final year. The student will select and investigate with departmental assistance a specific library, laboratory or field study. A written and oral presentation of the study will determine satisfactory completion of the course.

GEOL 421 Crystallography. (3) Two lectures and one laboratory a week. Prerequisite, MATH 115 or consent of instructor. An introduction to the study of crystals. Stresses the theoretical and practical relationships between the internal and external properties of crystalline solids. Encompasses morphological, optical and chemical crystallography.

GEOL 422 Mineralogy. (4) Two lectures and two laboratories a week. Prerequisite, GEOL 110 and 421 or consent of instructor. Basic elementary mineralogy with emphasis on description, identification, formation, concurrence and economic significance of approximately 150 minerals.

GEOL 423 Optical Mineralogy. (3) One lecture and two laboratories a week. Prerequisite, GEOL 422 or consent of instructor. The optical behavior of crystals with emphasis on the theory and application of the petrographic microscope.

GEOL 431 Invertebrate Paleontology. (4) Two lectures and one laboratory a week. Prerequisite, GEOL 102 or consent of instructor. ZOOL 102 or equivalent recommended. A systematic review of the morphology, classification, ecology, and geologic ranges of selected invertebrate groups represented in the fossil record.

GEOL 434 Micropaleontology. (3) Two lectures and one laboratory a week. Prerequisite, GEOL 431 or consent of instructor. A systematic review of the morphology, classification, ecology and geologic ranges of important microfossil groups, particularly ostracoses and foraminifera.

GEOL 436 Regional Geology of North America. (3) Prerequisite, GEOL 102 or consent of the instructor. A systematic study of the regional geology of North America including history, structure, stratigraphy and petrology of the physiographic provinces of the United States, Canada and the Caribbean.

GEOL 441 Structural Geology. (4) Two lectures and two laboratories a week. Prerequisite, GEOL 110 or consent of instructor. A study of the cause and nature of the physical stresses and resulting deformational responses in the earth. Laboratory exercises include crustal model studies and stereographic analysis of deformational structures.

GEOL 442 Sedimentation. (3) Two lectures and one laboratory a week. Prerequisite, GEOL 110 or consent of instructor. A study of the critical variables in sedimentation systems; origin, dispersion, accumulation, and properties of sediments and sedimentary rocks. Laboratories will include the measurement and statistical analysis of sediment properties and study of sedimentation rates.

GEOL 443 Petrology. (3) Prerequisite, GEOL 422 or consent of instructor. Two lectures and one laboratory per week. A detailed study of rocks: petrogenesis; distributions; chemical and mineralogical relation; macroscopic descriptions and geologic significance.

GEOL 444 Petrography. (3) One lecture and two laboratories a week. Prerequisites, GEOL 423, 442 or consent of instructor. Microscopic thin-section studies of rocks stressing the description and classification of igneous and metamorphic rocks.

GEOL 445 Principles of Geochemistry. (3) Three lectures per week. Prerequisite, CHEM 103 or equivalent and senior standing. A survey of historical and modern theories of the origin of elements and their distributions in space, on extra-terrestrial bodies and on earth. Discussion of the origin of igneous rocks, of the physical and chemical factors governing development and distribution of sedimentary rocks of the oceans and of the atmosphere. Organic sediments, the internal structures of earth and the planets. The role of isotopes in geothermometry and in the solution of other problems.

GEOL 446 Geophysics. (3) Two lectures and one laboratory a week. Prerequisite, PHYS 122 or consent of instructor. An introduction to the basic theories and principles of geophysics stressing such important applications as rock magnetism, gravity anomolies, crustal strain and earthquakes, and surveying.

GEOL 451 Groundwater Geology. (3) Prerequisite, GEOL 100 or consent of instructor. An introduction to the basic geologic parameters associated with the hydrologic cycle. Problems in the accumulation, distribution and movement of groundwater will be analyzed.

GEOL 452 Marine Geology. (3) Prerequisite, GEOL 100 or consent of instructor. An introduction to the essential elements of marine and estuarine geology including studies of currents, tides, waves, coastline development, shore erosion and marine and bay sedimentation.

GEOL 453 Economic Geology. (3) Two laboratories a week. Prerequisite, GEOL 422 or consent of instructor. A study of the geology of metallic ore deposits stressing ore-forming processes, configuration of important ore bodies, and familiarization with characteristic ore mineral suites.

GEOL 456 Engineering Geology. (3) Prerequisite, GEOL 441 or consent of the instructor. Two lectures and one laboratory a week. A study of the geological problems associated with the location of tunnels, bridges, dams and nuclear reactors, slope control, and natural hazards.

GEOL 460 Earth Science. (3) Two lectures and one laboratory a week. Prerequisite, permission of instructor. An interdisciplinary course designed to show how geology, meteorology, physical geography, soil science, astronomy and oceanography are interrelated in the study of the earth and its environment in space. Recommended for science education.

GEOL 462 Geological Remote Sensing. (3) One lecture and two laboratories a week. Prerequisites, GEOL 441 and 442, or 440, or consent of the instructor. An introduction to geological remote sensing including applications of aerial photographic interpretation to problems in regional geology, engineering geology, structural geology, and stratigraphy. Films, filters, and criteria used in selecting imagery are also discussed. Laboratory exercises include measurements of geologic parameters and compilation and transference of data to base maps.

GEOL 489 Special Topics in Earth Science. (1-3) Prerequisite, GEOL 460 or equivalent.

GEOL 499 Special Problems in Geology. (1-3) Prerequisites, GEOL 102 and 110 or equivalent, and consent of instructor. Intensive study of a special geologic subject or technique selected after consultation with instructor. Intended to provide training or instruction not available in other courses which will aid the student's development in his field of major interest.

German

GERM 111 Elementary German I. (3) Introduction to basic structures and pronunciation by emphasizing the four skills: listening, speaking, reading and writing. Three recitations per week, one laboratory hour.

GERM 112 Elementary German II. (3) Prerequisite, GERM 111. Continuation of GERM 111.

GERM 113 Review of Elementary German. (3) Designed for students whose placement examination scores are too high for placement in GERM 111 yet too low for placement in GERM 112. Covers the entire course work of GERM 111 and GERM 112 in one semester.

GERM 114 Intermediate Literary German. (3) Prerequisite, GERM 112 or 113 or equivalent. Further development of basic structures with emphasis on speaking and reading skills. Three recitations per week.

GERM 115 Intermediate German. (3) Prerequisite, GERM 114 or equivalent. Reading unabridged modern German literature, discussion and composition. Offered with emphasis on either literary or scientific readings.

GERM 116 Accelerated Intermediate German. (3) Prerequisite, placement by exam. GERM 116 covers the goals as well as the material of GERM 114 and GERM 115 in one semester.

GERM 221 Introduction to German Literature. (3) Prerequisite, GERM 114. Required of all students who continue in advanced literature courses with the exception of superior students who are permitted to bypass an introduction to German literature. May be taken concurrently with GERM 115.

GERM 301 Advanced Conversation and Composition I. (3) Prerequisite, GERM 115 or 116 or equivalent. Further practice in all four language skills with ample practice in composition. Concentration on cultural contrasts.

GERM 302 Advanced Conversation and Composition II. (3) Prerequisite, GERM 301 or equivalent. Continuation of GERM 301.

GERM 311 Advanced Conversation. (3) Prerequisite, GERM 115 or 116 or consent of instructor. For students who wish to develop fluency and confidence in speaking the language.

GERM 321 Survey of German Literature. (3) Prerequisite, GERM 221. A survey of the chief authors and major movements of German literature from the Hildebrandslied to the end of the 18th century.

GERM 322 Survey of German Literature. (3) Prerequisite, GERM 221. A survey of the chief authors and major movements of German literature from Romanticism to the present.

GERM 397 Honors Reading (Independent Study). (3) H — Honors. Supervised reading to be taken normally only by students admitted into honors program.

GERM 398 Honors Reading Course. (3) H — Honors. Discussion of a central theme with related investigations by students. Conducted in German.

GERM 400 Bibliography and Methods. (3) Introduction to the use of German bibliographies, catalogues, and reference books in order to locate both primary and secondary sources. Researching, composing, and documenting term papers and theses. Instruction in English.

GERM 431 Literature of the Middle Ages. (3) Prerequisite, GERM 321 and 322. German literature from the 9th through the 15th centuries in abridged modern German versions.

GERM 432 German Literature of the Baroque Period. (3) Prerequisite, GERM 321 and 322. Survey of baroque literature as it developed from the Renaissance, Humanism, the Reformation.

GERM 441 Enlightenment: Storm and Stress. (3) Prerequisites, GERM 321 and 322. Covers the time from Gottschedt's influence to Goethe's Italian journey (ca. 1720-1786). Shows the intellectual, ideological and literary influences in enlightenment and storm and stress.

GERM 442 Classicism. (3) Prerequisites, GERM 321 and 322. Covers the time from Goethe's Italian journey to Goethe's death (ca. 1786-1832). Intellectual, ideological and literary influences on the inner development and unity of this epoch.

GERM 451 Romanticism. (3) Prerequisites, GERM 321 and 322. Covers the main movements in German 'Fruh-und Spatromantik', with reference to music, arts, science, and philosophy.

GERM 452 Realism. (3) Prerequisites, GERM 321 and 322. Representative figures of German realism from Hebbel to Fontane.

GERM 461 Naturalism and its Counter Currents. (3) Prerequisites, GERM 321 and 322. Prose and dramatic writings from Gerhart Hauptmann to Expressionism. Modern literary and philosophical movements.

GERM 462 Expressionism to the Present. (3) Prerequisites, GERM 321 and 322. Prose and dramatic writings from Expressionism to present. Modern literary and philosophical movements.

GERM 469 Proseminar — Selected Topics in German Literature. (3) Specialized study of one great German writer or of relevant topics of literary criticism.

GERM 470 Structure of the German Language. (3) An introduction to applied linguistics suited to the needs of the advanced student and/or teacher of German. Structural analysis of the phonology, morphology and syntax of modern German in comparison with structure of modern English. Knowledge of German not required.

GERM 471 Introduction to Indo-European Philology. (3) Basic principles of historic language study. Reconstructed Indo-European surveys of the most important ancient Indo-European languages. No knowledge of German required.

GERM 472 Introduction to Germanic Philology. (3) Prerequisite, GERM 471 or permission of instructor. Reconstructed proto-Germanic, with surveys of Gothic, Old Norse, Old English, Old Saxon and Old High German. The high development of High German from the earliest documents to the modern dialects.

GERM 473 Reading Swedish, Danish and Norwegian I. (3) Develops reading facility in three languages in one semester. Texts read include Bergman's *Seventh Seal*, tales by H. C. Andersen, excerpts from works by Ibsen and Hamsun, and selected folk literature. No foreign language prerequisite.

GERM 474 Reading Swedish, Danish and Norwegian II. (3) Prerequisite, GERM 473 or permission of the instructor. Further development of reading facility.

GERM 479 Proseminar in Germanic Philology. (3) Prerequisite, consent of instructor. Selected topics such as comparative Germanic studies, Old Norse language or readings in Old Norse literature, modern German dialectology. Repeatable to a maximum of six credits if subject matter is different.

GERM 483 German Civilization (in English) I. (3) Literary, educational, artistic traditions; great men, customs and general culture.

GERM 484 German Civilization (in English) II. (3) Literary, educational, artistic traditions, great men, customs and general culture. A continuation of GERM 483.

GERM 488 German Literature in Translation. (3) Different movements, genres or other special topics will be discussed every semester. No knowledge of German necessary. May not be counted in fulfillment of German major requirement. Repeatable to a maximum of six credits if subject matter is different.

GERM 489 Proseminar in Germanic Culture. (3) Selected topics in the cultural and intellectual history of the German and Germanic language areas. In English. Repeatable to a maximum of six credits if subject matter is different.

GERM 499 Directed Study in German. (1-3) For advanced students, by permission of department chairman. Course may be repeated for credit if content differs. May be repeated to a maximum of six credits.

General Education

GNED 279 Selected Topics in the Social Sciences. (3) A series of student-initiated seminars in the social sciences.

GNED 289 Selected Topics in the Humanities. (3) A series of student-initiated seminars in the humanities.

GNED 299 Selected Topics in the Natural Sciences. (3) A series of student-initiated seminars in the natural sciences.

Greek

GREK 101 Elementary Greek. (3) A student who has had two units of Greek in high school may register for GREK 101 for purposes of review, but not for credit.

GREK 102 Elementary Greek. (3) A student who has had two units of Greek in high school may register for GREK 102 for credit with departmental permission.

GREK 203 Intermediate Greek (Grammar and Reading). (3) Prerequisite, GREK 101, 102 or equivalent.

GREK 204 Intermediate Greek (Homer). (3) Prerequisite, GREK 203 or equivalent.

GREK 290 Greek and Latin Medical Terminology. (3) Basic medical vocabulary through the study of Greek and Latin roots, prefixes and suffixes. No previous knowledge of Greek or Latin required.

GREK 300 Level Course Prerequisite: GREK 204 or equivalent. Except that, with the instructor's permission, a student who plans to take no more than four semesters of Greek may substitute GREK 352 for GREK 204.

GREK 351 Euripides. (3)

GREK 352 The New Testament. (3)

GREK 353 Herodotus. (3)

GREK 354 Greek Lyric Poetry. (3)

GREK 370 Greek Literature in Translation. (3) Selections in translation of Greek literature from Homer to Lucian, with special emphasis on epic and dramatic poetry. No knowledge of Greek or Latin is required.

GREK 400 Level Course Prerequisite: The status of advanced undergraduate or graduate and consent of the instructor.

GREK 401 Thucydides. (3)

GREK 402 Greek Philosophers. (3)

GREK 403 Greek Tragedy. (3)

GREK 404 Greek Comedy. (3)

GREK 405 Greek Oratory. (3)

GREK 406 Greek Epigraphy. (3)

GREK 499 Greek Readings. (3) Prerequisite, consent of the instructor. The reading of one or more selected Greek authors. May be repeated with different content.

Government and Politics

GVPT 100 Principles of Government and Politics. (3) A study of the basic principles and concepts of political science. This course may be used to satisfy, in part, the social science requirement in the general education program.

GVPT 170 American Government. (3) This course is designed as the basic course in government and it or its equivalent is a prerequisite to other courses in the department as specified in the catalog. It is a comprehensive study of government in the United States — national, state and local.

GVPT 210 Introduction to Public Administration and Policy. (3) Prerequisite, GVPT 170. An introduction to the study of the administrative process in the executive branch with an examination of the concepts and principles of administration and their relationship to public policy. The organizational structure, theory and the behavior of participants in the administration of policy.

GVPT 220 Introduction to Political Behavior. (3) Prerequisite, GVPT 170. Development, concepts and techniques of the behavioral approach to political science. Comparison with traditional approaches.

GVPT 240 Political Ideologies. (3) Prerequisite, GVPT 170. A survey and analysis of the leading ideologies of the modern world, including anarchism, communism, socialism, fascism, nationalism, and democracy.

GVPT 260 State and Local Government. (3) Prerequisite, GVPT 170. A study of the functioning and problems of state and local government in the United States, with illustrations from Maryland jurisdictions.

GVPT 272 The Politics of Race Relations in the United States. (3) Political dimension of historical and contemporary racial cleavage in the United States with particular emphasis on the post World War II period.

GVPT 280 Comparative Politics and Governments. (3) An introduction to the field of comparative politics including exposure to the analytic frameworks through which comparative studies of politics and governmental institutions can be undertaken

and a survey of the salient types of political systems.

GVPT 300 International Political Relations. (3) A study of the major factors underlying international relations, the methods of conducting foreign relations, the foreign policies of the major powers, and the means of avoiding or alleviating international conflicts. This course may be used to satisfy, in part, the social science requirement in general education program.

GVPT 375 Academic Field Research in Government and Politics. (6) Field research is based on the data gathered by the student during his internship assignment. Students conduct a major research project on a subject of interest to modern, theoretical political science based on a research design approved by an academic adviser. The course is open only to GVPT majors and intended to be taken concurrently with GVPT 377. The research conducted under GVPT 375 will be substantially different from the project done for GVPT 376.

GVPT 376 Applied Field Research in Government and Politics. (6) Students in this course participate as interns in an agency of government or in some other appropriate political organization. Assignments are arranged to provide students with insights into both theoretical and practical aspects of politics. Under the tutelage of the host agency and an academic adviser, students conduct a major research project of mutual interest to the student and his host agency in the field of government and politics. The course is open only to GVPT majors and must be taken concurrently with GVPT 377.

GVPT 377 Seminar for Academic Interns. (3) This seminar stresses the application of major concepts of political science as they apply to the realities of the political process. Readings and discussion attempt to relate the experiences of the academic interns to appropriate literature on the subject of political decision-making. This course is open only to GVPT majors and is intended for students concurrently enrolled in GVPT 376 and/or 375.

GVPT 388 Topical Investigations. (3) Independent research and writing on selected topics in government and politics. Prerequisite of upper division standing and consent of the instructor. This course may be taken not more than twice for academic credit towards graduation.

GVPT 390 Honors Seminar in American Government and Public Administration. (3) H—Honors. Prerequisite, admission to honors program. Directed reading, reporting and discussion on the major materials of historical and contemporary relevance in the fields of American government and public administration.

GVPT 391 Honors Seminar in Comparative Government and International Relations. (3) H—Honors. Prerequisite, admission to honors program. Directed reading, reporting and discussion centering on the major materials of historical and contemporary relevance in the fields of comparative government and international relations.

GVPT 392 Honors Seminar in Public Law and Political Theory. (3) H — Honors. Prerequisite, admission to honors program. Directed reading, reporting and discussion centering on the major materials of historical and contemporary relevance in the fields of public law and political theory.

GVPT 393 Honors Seminar in Public Policy, Political Behavior, and Methodology. (3) H—Honors. Prerequisite, admission to honors program. Directed reading, reporting and discussion centering on the major materials of historical and contemporary relevance in the fields of public policy and political behavior.

GVPT 397 Honors Research. (3) H — Honors. Prerequisite, admission to honors program. Individual reading and research. In his last semester each student prepares an original paper.

GVPT 399 Seminar in Government and Politics. (3) Reading, research, discussion, analysis, and writing in the area of politics. Both substantive issues and methodological approaches will be considered. Primarily for government and politics undergraduate majors. Not open to graduate students.

GVPT 401 Problems of World Politics. (3) Prerequisite, GVPT 170. A study of governmental problems of international scope, such as causes of war, problems of neutrality, and propaganda. Students are required to report on readings from current literature.

GVPT 402 International Law. (3) Prerequisite, GVPT 170. A study of the basic character, general principles and specific rules of international law, with emphasis on recent and contemporary trends in the field and its relation to other aspects of international affairs.

GVPT 411 Public Personnel Administration. (3) Prerequisite, GVPT 410 or BSAD 360. A survey of public personnel administration, including the development of merit civil service, the personnel agency, classification, recruitment, examination techniques, promotion, service ratings, training, discipline, employee relations, and retirement.

GVPT 412 Public Financial Administration. (3) Prerequisite, GVPT 410 or ECON 450. A survey of governmental financial procedures, including processes of current and capital budgeting, the administration of public borrowing, the techniques of public purchasing, and the machinery of control through pre-audit and post-audit.

GVPT 413 Governmental Organization and Management. (3) Prerequisite, GVPT 410. A study of the theories of organization and management in American government with emphasis on new trends, experiments and reorganizations.

GVPT 414 Administrative Law. (3) Prerequisite, GVPT 170. A study of the discretion exercised by administrative agencies, including analysis of their functions, their powers over persons and property, their procedures, and judicial sanctions and controls.

GVPT 417 Comparative Study of Public Administration. (3) Prerequisite, GVPT 280 or 410, or consent of instructor. An introduction to the study of governmental administrative systems viewed from the standpoint of comparative typologies and theoretical schemes useful in cross-national comparisons and empirical studies of the politics of the administrative process in several nations. Both western and non-western countries are included.

GVPT 422 Quantitative Political Analysis. (3) Prerequisite, GVPT 220, or consent of instructor. Introduction to quantitative methods of data analysis, including selected statistical methods, block analysis, content analysis, and scale construction.

GVPT 426 Public Opinion. (3) Prerequisite, GVPT 170. An examination of public opinion and its effect on political action, with emphasis on opinion formation and measurement, propaganda and pressure groups.

GVPT 427 Political Sociology. (3) Prerequisite, GVPT 220, or consent of instructor. A study of the societal aspects of political life including selected aspects of the sociology of group formation and group dynamics, political association, community integration and political behavior presented in the context of the societal environments of political systems.

GVPT 429 Problems in Political Behavior. (3) Prerequisite, GVPT 170. The problem approach to political behavior with emphasis on theoretical and empirical studies on selected aspects of the political process.

GVPT 431 Introduction to Constitutional Law. (3) Prerequisite, GVPT 170. A systematic inquiry into the general principles of the American constitutional system, with special reference to the role of the judiciary in the interpretation and enforcement of the federal constitution.

GVPT 432 Civil Rights and the Constitution. (3) Prerequisite, GVPT 431. A study of civil rights in the American constitutional context, emphasizing freedom of religion, freedom of expression, minority discrimination, and the rights of defendants.

GVPT 433 The Judicial Process. (3) Prerequisite, GVPT 170. An examination of judicial organization in the United States at all levels of government, with some emphasis on legal reasoning, legal research and court procedures.

GVPT 434 Race Relations and Public Law. (3) Prerequisite, GVPT 170. A political and legal examination of the constitutionally protected rights affecting racial minorities and of the constitutional power of the federal courts, Congress, and the executive to define, protect and extend these rights.

GVPT 435 Judicial Behavior. (3) A study of judicial decision making at the state and national levels, drawing primarily on the more recent quantitative and behavioral literature.

GVPT 441 History of Political Theory — Ancient and Medieval. (3) Prerequisite, GVPT 170. A survey of the principal political theories set forth in the works of writers before Machiavelli.

GVPT 442 History of Political Theory — Modern and Recent. (3) Prerequisite, GVPT 170. A survey of the principal political theories set forth in the works of writers from Machiavelli to J. S. Mill.

GVPT 443 Contemporary Political Theory. (3) Prerequisite, GVPT 441 or 442. A survey of the principal political theories and ideologies from Karl Marx to the present.

GVPT 444 American Political Theory. (3) Prerequisite, GVPT 170. A study of the development and growth of American political concepts from the Colonial period to the present.

GVPT 445 Russian Political Thought. (3) Prerequisite, GVPT 170. A survey and analysis of political ideas in Russia and the Soviet Union from early times to the present.

GVPT 448 Non-Western Political Thought. (3) Political thought originating in Asia, the Middle East, and Africa. This is not a survey of all non-western political thought, but a course to be limited by the professor with each

offering. When repeated by a student, consent of instructor is required.

GVPT 450 Comparative Study of Foreign Policy Formation. (3) Prerequisite, GVPT 280 or 300, or consent of instructor. An introduction to the comparative study of foreign policy formation structures and processes followed by a survey of the domestic sources of policy for major states. A conspectus of substantive patterns of foreign policy in analytically salient types of systems is presented. Domestic and global systemic sources of foreign policy are compared.

GVPT 451 Foreign Policy of the U.S.S.R. (3) Prerequisite, GVPT 170. A study of the development of the foreign policy of the Soviet Union, with attention paid to the forces and conditions that make for continuities and changes from Tsarist policies.

GVPT 452 Inter-American Relations. (3) Prerequisite, GVPT 170. An analytical and historical study of the Latin-American policies of the United States and of problems in our relations with individual countries, with emphasis on recent developments.

GVPT 453 Recent East Asian Politics. (3) Prerequisite, GVPT 170. The background and interpretation of recent political events in East Asia and their influence on world politics.

GVPT 454 Contemporary African Politics. (3) Prerequisite, GVPT 170. A survey of contemporary development in the international politics of Africa, with special emphasis on the role of an emerging Africa in world affairs.

GVPT 455 Contemporary Middle Eastern Politics. (3) Prerequisite, GVPT 170. A survey of contemporary development in the international politics of the Middle East, with special emphasis on the role of emerging Middle East nations in world affairs.

GVPT 457 American Foreign Relations. (3) Prerequisite, GVPT 170. The principles and machinery of the conduct of American foreign relations, with emphasis on the Department of State and the foreign service, and an analysis of the major foreign policies of the United States.

GVPT 460 State and Local Administration. (3) Prerequisite, GVPT 170. A study of the administrative structure, procedures and policies of state and local governments with special emphasis on the state level and on intergovernmental relationships, and with illustrations from Maryland governmental arrangements.

GVPT 461 Metropolitan Administration. (3) Prerequisite, GVPT 170. An examination of administrative problems relating to public services, planning and coordination in a metropolitan environment.

GVPT 462 Urban Politics. (3) Urban political process and institutions considered in the light of changing social and economic conditions.

GVPT 473 Legislatures and Legislation. (3) Prerequisite, GVPT 170. A comprehensive study of legislative organization procedure and problems. The course includes opportunities for student contact with Congress and with the legislature of Maryland.

GVPT 474 Political Parties. (3) Prerequisite, GVPT 170. A descriptive and analytical examination of American political parties, nominations, elections, and political leadership.

GVPT 475 The Presidency and the Executive Branch. (3) Prerequisite, GVPT 170. An examination of the executive, legislative and party roles of the President in the political process.

GVPT 479 Problems of American Public Policy. (3) Prerequisite, GVPT 170. The background and interpretation of various factors which affect the formation and execution of American public policy.

GVPT 480 Comparative Political Systems. (3) Prerequisite, GVPT 280 and at least one other course in comparative government. A study, along functional lines, of major political institutions, such as legislatures, executives, courts, bureaucracies, public organizations, and political parties.

GVPT 481 Government and Administration of the Soviet Union. (3) Prerequisite, GVPT 170. A study of the adoption of the Communist philosophy by the Soviet Union, of its governmental structure and of the administration of government policy in the Soviet Union.

GVPT 482 Government and Politics of Latin America. (3) Prerequisite, GVPT 170. A comparative study of the governmental systems and political processes of the Latin American countries, with special emphasis on Argentina, Brazil, Chile, and Mexico.

GVPT 483 Government and Politics of Asia. (3) Prerequisite, GVPT 280 or 453, or HIST 261 or 262 or HIFN 442 or 445. A comparative study of the political systems of China, Japan, India and other selected Asian countries.

GVPT 484 Government and Politics of Africa. (3) Prerequisite, GVPT 170. A comparative study of the governmental systems and political processes of the African countries, with special emphasis on the problems of nation-building in emergent countries.

GVPT 485 Government and Politics of the Middle East. (3) Prerequisite, GVPT 170. A comparative study of the governmental systems and political processes of the Middle Eastern countries, with special emphasis on the problems of nation-building in emergent countries.

GVPT 486 Comparative Studies in European Politics. (3) Prerequisite, GVPT 280, or consent of instructor. A comparative study of political processes and governmental forms in selected European countries.

GVPT 487 The Government and Politics of South Asia. (3) Political systems and governments of such countries as India, Pakistan, Bangladesh, Ceylon, and Nepal.

GVPT 492 The Comparative Politics of Race Relations. (3) Impact of government and politics on race relations in various parts of the world. The origins, problems, and manifestations of such racial policies as segregation, apartheid, integration, assimilation, partnership, and nonracialism will be analyzed.

Hebrew

HEBR 101 Intensive Elementary Hebrew. (4) Five hours per week. Limited to students with no reading knowledge of Hebrew. Modern Israeli Hebrew. Emphasis on conversation. Study of linguistic structure and development of audio-lingual, writing and reading ability. Credit may not be earned for both HEBR 101 and HEBR 111.

HEBR 111 Elementary Hebrew. (3) Three recitations per week and one drill hour. Modern Israeli Hebrew. Emphasis on conversation. Study of linguistic structure and development of audio-lingual, writing and reading ability.

HEBR 112 Elementary Hebrew. (3) Three recitations per week and one drill hour. Prerequisite, HEBR 111 or 101 or equivalent. Modern Israeli Hebrew. Emphasis on conversation. Study of linguistic structure and development of audio-lingual, writing and reading ability.

HEBR 114 Intermediate Hebrew. (3) Three recitations per week and one drill hour. Prerequisite, HEBR 112 or equivalent. Study of linguistic structure, further development of audio-lingual, reading, writing, and speaking skills. Reading of texts and newspapers designed to give some knowledge of Hebrew life, thought and culture.

HEBR 115 Intermediate Hebrew. (3) Three recitations per week and one drill hour. Prerequisite, HEBR 114 or equivalent. Completion of study of linguistic structure, further development of audio-lingual, reading, writing and speaking skills. Reading of texts and newspapers designed to give some knowledge of Hebrew life, thought and culture.

HEBR 201 Conversation and Composition. (3) Prerequisite, HEBR 115 or equivalent. A practical language course recommended for all students continuing with Hebrew. Review of grammar and composition. Selected readings. Oral and written exercises.

HEBR 301 Conversation and Composition. (3) Prerequisite, HEBR 201 or equivalent. A practical language course recommended for all students continuing with Hebrew. Review of grammar and composition. Selected readings. Oral and written exercises.

HEBR 321 Survey of Hebrew Literature. (3) Prerequisite, HEBR 115 or equivalent. From the Haskalah (Enlightenment) until the Renaissance of modern Hebrew. From Mendelsohn to Mendele Mocher Seforim and Sholom Aleichem. Readings in Hebrew. Discussion may be in English. Students with insufficient Hebrew preparation may receive permission to audit.

HEBR 322 Survey of Hebrew Literature. (3) Prerequisite, HEBR 115 or equivalent. From the modern Hebrew revival period until today. Bialik, Peretz, Agnon and contemporary writers. Readings in Hebrew. Discussion may be in English. Students with insufficient Hebrew preparation may receive permission to audit.

HEBR 333 Hebrew Civilization (in English). (3) Major trends in the cultural, social, and literary history of the Jews from their earliest experiences as a people up to the present.

HEBR 334 Hebrew Civilization (in English). (3) Major trends in the cultural, social, and literary history of the Jews from their earliest experiences as a people up to the present.

HEBR 423 The Hebrew Bible in Translation I. (3) Selected readings from the Bible and its commentaries, classical and modern. Major concepts of Biblical thought.

HEBR 424 The Hebrew Bible in Translation II. (3) A continuation of HEBR 423.

HEBR 431 Modern and Contemporary Hebrew Literature. (3) The period of the Haskalah (Enlightenment) and the period of the Tehiah (modern revival).

HEBR 432 Modern and Contemporary Hebrew Literature. (3) Readings in problems facing modern man as reflected in the writings of Agnon, Burla, Berkowitz, Mosensohn, etc.

Training in literary criticism. Reading of periodicals with modern literary criticism.

HEBR 441 Studies in Classical Hebrew. (3) Linguistic peculiarities of classical Hebrew style from pre-Biblical epigraphic records to the Dead Sea Scrolls. Applies the method of literary form criticism to poetry and songs, cultic formulae, historical annals and narratives. Prerequisite, HEBR 301.

HEBR 442 Studies in Classical Hebrew. (3) Pentateuchal source analysis, prophetic oracles, Biblical law in comparison with other ancient codes, wisdom literature, the apocalyptic form and the manual of discipline of the Dead Sea Scrolls. Prerequisite, HEBR 301.

HEBR 498 Special Topics in Hebrew. (3) Prerequisite, as announced in the schedule of classes for each topic. Repeatable for a maximum of six credits provided the content is different.

Hearing and Speech Sciences

HESP 202 Fundamentals of Hearing and Speech Sciences. (3) Introduction to phonetics, the physiological bases of speech production and reception, and the physics of sound. Required of majors in hearing and speech science and recommended for majors in education and psychology.

HESP 302 Speech Pathology I. (3) For majors. Prerequisite, HESP 202. Etiology, assessment, and treatment of articulation disorders.

HESP 305 Anatomy and Physiology of the Speech Mechanism. (3) Prerequisite, HESP 202. Anatomy, physiology, and neurology of speech mechanism. Physiological phonetics.

HESP 310 Semantic Aspects of Speech in Human Relations. (3) Prerequisite, HESP 202. An analysis of speech and language habits from the standpoint of general semantics.

HESP 312 Instrumentation in Hearing and Speech Sciences. (3) Prerequisites, HESP 202 and PHYS 102. Principles of operation of electronic equipment in the hearing and speech sciences.

HESP 400 Speech and Language Development of Children. (3) Prerequisite, HESP 202. Analysis of normal processes of speech and language development in children.

HESP 401 Survey of Speech Disorders. (3) Communication disorders in school children. May not be used by majors in hearing and speech sciences to satisfy major or supporting course requirements.

HESP 403 Introduction to Phonetic Science. (3) Prerequisites, HESP 202 and PHYS 102. Phonetic transcription and phonetic principles. Acoustical and perceptual phonetics.

HESP 404 Speech Pathology II. (3) Prerequisite, HESP 302, 305. Etiology and therapeutic management of cleft palate and stuttering.

HESP 406 Speech Pathology III. (3) Prerequisite, HESP 302, 305. Etiology and therapeutic management of aphasia and delayed language.

HESP 408 Clinical Practice. (3) Prerequisites, completion of the 21 hours of specified courses for the major, HESP 404 or HESP 406, and permission of the clinical staff. Observation and participation in the speech and hearing clinic. Repeatable to a maximum of six credits, but only three credits may apply toward satisfaction of the major course requirement in hearing and speech sciences.

HESP 410 Principles and Methods in Speech Therapy. (3) Prerequisite, HESP 404 or 406. Comparative methods in the clinical management of speech problems.

HESP 411 Introduction to Audiology. (3) Prerequisites, HESP 202 and PHYS 102. Anatomy and physiology of hearing, introduction to measurement and to rehabilitation of the hearing-handicapped.

HESP 412 Rehabilitation of the Hearing Handicapped. (3) Prerequisite, HESP 411. Speech reading, auditory training, and speech training for hard-of-hearing children and adults.

HESP 414 Seminar. (3) Prerequisite, permission of instructor. Individual projects in phonetic science, speech pathology, and audiology.

HESP 499 Independent Study. (1-3) Prerequisite, departmental approval. May be repeated for a maximum of 6 credits.

History, Foreign

HIFN 310 Europe in the 19th Century, 1815-1919. (3) The political, economic, social, and cultural development of Europe from the Congress of Vienna to the First World War.

HIFN 311 Europe in the World Setting of the 20th Century. (3) Political, economic and cultural developments in 20th century Europe with special emphasis on the factors involved in the two world wars and their global impacts and significance.

HIFN 354 History of the Jewish People I. (3) An introduction to the history of the Jewish people treating its political, economic, social and cultural development from the Biblical period to the late Middle Ages. Special attention will be given to the emergence of Rabbinic Judaism and its subsequent encounter with Medieval Christian and Islamic civilizations. Students who have previously received credit for HIFN 454 may not enroll in HIFN 354.

HIFN 355 History of the Jewish People II. (3) An introduction to the history of the Jewish people treating its political, economic, social and cultural development from the end of the Middle Ages to the present. Special attention will be given to twentieth century developments including the Nazi holocaust and its aftermath, the Zionist movement and the creation of the State of Israel, as well as the rise of the contemporary American Jewish community.

HIFN 360 Fascism: Theory and Practice. (3) The origins and history of Fascism in Europe, 1918-1945. Emphasis divided between the industrialized (or industrializing) nations and the largely agrarian countries of Europe. The rise of Fascism in other parts of the world.

HIFN 374 Twentieth Century Algeria. (3) A brief survey of the history of Algeria and an in-depth study of twentieth century events leading up to and including the war of liberation and Algerian independence. Reading knowledge of French desirable.

HIFN 401 The History of Iberia to 1700. (3) A survey of the ancient, medieval, and early modern history of the Iberian peninsula with attention to Spanish and Portuguese expansion overseas and the role of Spain in Europe under the Hapsburg kings.

HIFN 402 The History of Iberia from 1700. (3) The social, political and cultural development of modern Spain and Portugal, emphasizing the decline of the monarchies, Napoleonic intervention, the loss of the main part of the overseas empires, civil strife, and the rise of strong-man government.

HIFN 403 Diplomatic History of Latin America. (3) A survey of the political, economic and cultural relations of the Latin American nations with emphasis on their relations with the United States and the development of the inter-American system.

HIFN 404 History of Canada. (3) Prerequisites, HIST 241, 242 or 253, 254. A history of Canada, with special emphasis on the nineteenth century and upon Canadian relations with Great Britain and the United States.

HIFN 405 History of Brazil. (3) The history of Brazil with emphasis on the national period.

HIFN 406 History of Mexico and the Caribbean I. (3) History of Mexico, Central America and the Antilles, beginning with the pre-Spanish Indian cultures and continuing through European contact, conquest, and colonial dominance, down to the beginning of the Mexican war for independence in 1810.

HIFN 407 History of Mexico and the Caribbean II. (3) A continuation of HIFN 406 with emphasis on the political development of the Mexican nation.

HIFN 411 Medieval Civilization I. (3) Europe from the fall of Rome to the death of Charlemagne. The economic, social and intellectual movements which shaped the civilization of the Latin west, including the rise of Christianity and the Church, the creation of a feudal nobility, and the foundation of European states. Developments in art and literature. Readings from sources when available in translation.

HIFN 412 Medieval Civilization II. (3) Medieval civilization in the 12th and 13th centuries: the Renaissance of the 12th century, the rise of universities, Gothic architecture, the European state system, medieval parliaments and scholastic learning and culture. Emphasis on cultural and political developments of the High Middle Ages with study of the principal sources of medieval thought and learning, art and architecture and political theory. Recommended as a sequel to HIFN 411.

HIFN 413 The Old Regime and the French Revolution, 1748-1815. (3) Europe during the French Revolution and Napoleonic period. Intellectual, social, and cultural movements in revolutionary Europe.

HIFN 414 History of European Ideas I. (3) Review of the basic western intellectual traditions as a heritage from the ancient world. Selected important currents of thought from the scientific revolution of the 16th and 17th centuries down to the end of the 18th century.

HIFN 415 History of European Ideas II. (3) A continuation of HIFN 414 emphasizing 19th and 20th century thought.

HIFN 416 The Renaissance. (3) Survey of European society (1300-1550), with particular attention to the civilization of the Renaissance in Italy. Emphasis on intellectual and artistic developments, with consideration of the economic foundation of Renaissance culture, the politics of cultural transformation, and the relationship between social change and the emergence of new value-systems governing European life in the period of the Renaissance.

HIFN 417 The Reformation. (3) Major developments from the 'pre-Reformation' to the 'post-Reformation'. Religion is emphasized as the fundamental motive force resulting in

the reformations of the 16th century. The interaction between religious forces and the political, socio-economic, intellectual, and cultural trends of the period are also considered

HIFN 420 History of the British Empire. (3) An analysis of the development of the British Empire since the American Revolution. Particular emphasis is given to the problem of responsible self-government, the evolution of the British Empire into a commonwealth of nations and the problems of the dependent empire. Recommended prerequisites — HIST 112, 113, 141, or 254

HIFN 421 History of the British Empire. (3) Prerequisite, HIST 241, 242 or 253, 254. Second semester, the rise of the second British Empire and the solution of the problem of responsible self-government (1783-1867), the evolution of the British Empire into a commonwealth of nations, and the development and problems of the dependent empire.

HIFN 422 Constitutional History of Great Britain. (3) Constitutional development in England, with emphasis on the history of the royal prerogative, the growth of the common law, the development of Parliament, and the emergence of systematized government. First semester, to 1485.

HIFN 423 Constitutional History of Great Britain. (3) Constitutional development in England, with emphasis on the history of the royal prerogative, the growth of the common law, the development of Parliament, and the emergence of systematized government. Second semester, since 1485.

HIFN 424 History of Russia to 1801. (3) A history of Russia from earliest times to 1917.

HIFN 425 History of Russia from 1801-1917. (3) A history of Russia from earliest times to 1917.

HIFN 432 The Soviet Union. (3) A history of Soviet Russia and the Soviet Union from 1917 to the present. Stress on the relationship between Marxist theory and practice, and the development of peculiarly socialist institutions and practices.

HIFN 433 Modern France from Napoleon to DeGaulle. (3) The changing political and cultural values of French society in response to recurrent crises throughout the 19th and 20th centuries. Students should have had some previous survey of either western civilization or European history.

HIFN 434 Tudor England. (3) An examination of the political, religious and social forces in English life, 1485-1603, with special emphasis on Tudor government, the English Reformation and the Elizabethan era.

HIFN 435 Stuart England. (3) An examination of the political, religious and social forces in English life, 1603-1714, with special emphasis on Puritanism and the English revolutions.

HIFN 436 Britain in the 18th Century. (3) Developments in Great Britain from the revolution of 1688 to the end of the Napoleonic Wars.

HIFN 437 Modern Britain. (3) A survey of British history from the age of the French Revolution to World War I with emphasis upon such subjects as Britain's role in the world, the democratization of the state, the problems arising from industrialism and urbanism, and Irish and Imperial problems.

HIFN 438 Introductory Middle Eastern Languages I. (3) Prerequisite, consent of the department. An introduction to the three principal languages of the Islamic Middle East — Arabic, Persian, and Turkish. Only standard written form of the three languages is taught May be repeated to a maximum of nine hours when language varies. May not be used to satisfy arts and humanities language requirement.

HIFN 439 Introductory Middle Eastern Languages II. (3) Prerequisite, HIFN 438 and consent of the department. Continuation of HIFN 438. May be repeated to a maximum of nine hours when language varies. May not be used to satisfy arts and humanities language requirement.

HIFN 442 History of Traditional China. (3) China from earliest times to 1644 A.D. Emphasis on the development of traditional Chinese culture, society, and government.

HIFN 443 A History of Modern China. (3) Modern China from 1644 to the People's Republic of China. Emphasis on the coming of the West to China and the various stages of the Chinese reaction.

HIFN 444 The Age of Absolutism, 1648-1748. (3) Europe in the age of Louis XIV, with emphasis upon social, religious, and cultural developments.

HIFN 445 History of Japan to 1800. (3) Traditional Japanese civilization from the age of Shinto mythology and introduction of continental learning down to the rule of military families, the transition to a money economy, and the creation of a townsmen's culture. A survey of political, economic, religious, and cultural history.

HIFN 446 History of Japan Since 1800. (3) Japan's renewed contact with the western world and emergence as a modern state, industrial society, and world power, 1800-1931; and Japan's road to war, occupation, and recovery, 1931 to the present.

HIFN 448 Intermediate Middle Eastern Languages I. (3) Prerequisite, HIFN 439 and consent of the department. Continuation of HIFN 439. May be repeated to a maximum of nine hours when language varies. May not be used to satisfy arts and humanities language requirement.

HIFN 449 Intermediate Middle Eastern Languages II. (3) Prerequisite, HIFN 448 and consent of the department. Continuation of HIFN 448. May be repeated to a maximum of nine hours when language varies. May not be used to satisfy arts and humanities language requirement.

HIFN 450 The Middle East. (3) A survey of the political, cultural and institutional history covering the period up to the tenth century.

HIFN 451 The Middle East. (3) A survey of the political, cultural and institutional history covering the period up from the tenth century to the beginnings of the nineteenth century.

HIFN 452 The Contemporary Middle East. (3) This course covers the break-up of the Ottoman Empire and the emergence of contemporary states of the area.

HIFN 455 History of the Argentine Republic. (3) Concentration upon the recent history of Argentina with emphasis upon the social and economic development of a third world nation.

HIFN 456 Ancient Greece. (3) Greek history and culture from the Bronze Age to 200 B.C. Concentration on the life and institutions of the city-state, poetry and society, the Peloponnesian War, and Alexander the Great.

HIFN 457 History of Rome. (3) Roman history from the foundation of the city to the time of Constantine the Great, concentrating on imperialism, the crisis of the Republic, Augustus and the organization of monarchy, and city life during the Principate. (Students who have received credit for HIFN 410 not admitted.)

HIFN 458 Advanced Middle Eastern Languages I. (3) Prerequisite, HIFN 449 or equivalent and consent of the department Continuation of HIFN 449 May be repeated to a maximum of nine hours when language varies. May not be used to satisfy arts and humanities language requirement.

HIFN 459 Advanced Middle Eastern Languages II. (3) Prerequisite, HIFN 458 and consent of the department. Continuation of HIFN 458. May be repeated to a maximum of nine hours when language varies. May not be used to satisfy arts and humanities language requirement.

HIFN 460 Social and Cultural History of Europe. (3) An exploration of social structure, life styles, rituals, symbols, and myths of the peoples of Europe.

HIFN 462 Germany in the Nineteenth Century, 1815-1914. (3) The development of modern Germany and the rise of national socialism.

HIFN 463 Germany in the Twentieth Century, 1914-1945. (3) Germany's aims and policies during World War I, its condition and policies in the inter-war period, the rise of national socialism, and Germany's part in World War II.

HIFN 464 Nineteenth Century European Diplomatic History. (3) The development and execution of European diplomacy from the Congress of Vienna to the outbreak of World War I, concentrating on central and western Europe.

HIFN 465 Twentieth Century European Diplomatic History. (3) The development and execution of European diplomacy from the outbreak of World War I to the conclusion of World War II, concentrating on central and western Europe.

HIFN 466 Byzantine Empire I. (3) The Eastern Roman Empire from Constantine the Great to the crisis of the ninth century. The development of the late Roman state into the medieval Christian Byzantine Empire and the evolution of a distinctive Byzantine culture.

HIFN 467 Byzantine Empire II. (3) The Byzantine Empire from the Macedonian Renaissance to the conquest of Constantinople by the Turks in 1453; the Byzantine Empire at its height, the Crusades, Byzantium as a minor power, and its contributions to the Renaissance and the cultures of Russia and the Balkans.

HIFN 470 European Economic History to 1750. (3) Economic development of Europe from the manorial economy of medieval feudalism through the emergence of capitalist institutions and overseas empires to the advent of the industrial revolution.

HIFN 471 European Economic History Since 1750. (3) The mainsprings of the industrial revolution first in 18th century England and then across the rest of Europe during the 19th and 20th centuries. Emphasis on the English, French, German, Austro-Hungarian and Russian experiences with private capitalism and public policy, including Fascism and Communism. Social consequences of industrial development such as urbanization and the rise of labor movements.

HIFN 474 A History of West Africa. (3) West Africa from approximately 4500 B.C. to the colonial era. The development of agricultural and technological achievements, which made it possible for West African civilizations to emerge and endure and the development of the medieval and early modern state systems. The structure of West African societies, the people and their cultural history.

HIFN 475 Economic History of West Africa. (3) The economic history of West Africa from neolithic times to the end of the colonial era. Reading knowledge of French desirable.

HIFN 476 Modern Balkan History. (3) A political, socio-economic, and cultural history of Yugoslavia, Bulgaria, Romania, Greece and Albania from the breakdown of Ottoman domination to the present. Emphasis is on movements for national liberation during the nineteenth century and on approaches to modernization in the twentieth century.

HIFN 480 Modern Jewish Intellectual History I. (3) An introduction to the major ideas and ideologies of the Jewish people from the period of the expulsion from Spain in 1492 until the generation of Moses Mendelssohn and his contemporaries at the end of the eighteenth century. The course will emphasize the major intellectual developments within the Jewish community shaped by its encounter with major cultural developments as the Renaissance, Reformation and religious scepticism as well as by the constant threats to its collective identity and physical well-being throughout this entire period.

HIFN 481 Modern Jewish Intellectual History II. (3) An introduction to the major ideas and ideologies of the Jewish people from the end of the eighteenth century until the present. The course will consider the major intellectual responses to the problem of Jewish identity in the context of the effects of political and social emancipation, nationalism and socialism, secularism and cultural assimilation, as well as political anti-Semitism and physical extermination upon the Jewish community.

HIFN 485 History of Chinese Communism. (3) An analysis of the various factors in modern Chinese history that led to the victory of the Chinese Communist Party in 1949 and of the subsequent course of events of the People's Republic of China, from ca. 1919 to the present.

History

HIST 100 Great Ideas, Events, and Figures in European History. (3) Selected subjects of European civilization and culture intended to involve beginning students in a few major themes intensively treated.

The Emergence of Europe

HIST 110-113 The following sequence of courses taken together constitutes a thorough treatment of the evolution of European civilization. Each course or any series of courses may, however, be taken independently. The courses have been specifically designed for meeting general university requirements.

HIST 110 The Ancient World. (3) Interpretation of select literature and art of the ancient Mediterranean world with a view to illuminating the antecedents of modern culture: religion and myth in the ancient Near East; Greek philosophical, scientific, and literary invention; and the Roman tradition in politics and administration.

HIST 111. The Medieval World. (3) The development of Europe in the Middle Ages; emphasis on the role of religious values in shaping new social, economic, and political institutions. Readings in medieval literature and consideration of monuments in art and architecture.

HIST 112 The Rise of the West — 1500-1789. (3) History of early modern Europe. Emphasis on the developments of the national consciousness of several continental European peoples with references to England and eastern Europe. Evidence of the growth of state power and bureaucracy, the role of economic institutions, the developments in art, literature, science and religion.

HIST 113 Modern Europe — 1789-Present. (3) Nation-states in Europe since the outbreak of the French Revolution. Rapid changes in industrial-economic structure and in demography related to national growths. Emergence of a distinctly modern secular society including 'Europeanism' throughout the world. Emphasis on continental, western European countries and peoples, eastern Europe and insular Great Britain.

HIST 141 Western Civilization I. (3) Recommended for students seeking a two-semester survey course of European history from antiquity to the twentieth century. Political, social and intellectual developments that form the values and institutions of western world. Ends with the period of Reformation. May be taken independently of HIST 142. (Students previously enrolled in HIST 241 not admitted to this course.)

HIST 142 Western Civilization II. (3) Recommended for students seeking a two-semester survey course of European history from antiquity to the twentieth century. Begins with period of the Reformation and ends with modern times and may be taken independently of HIST 141. (Students previously enrolled in HIST 242 not admitted to this course.)

HIST 151 The Humanities I. (3) A survey of man's cultural development from pre-historic times to the Renaissance. Particular emphasis is given to the arts, philosophy, religion, and social conditions which have influenced the common cultural heritage of western civilization. Aspects of the culture of the non-western world included when appropriate. Students previously enrolled in HIST 251 not admitted.

HIST 152 The Humanities II. (3) A survey of man's cultural development from the Renaissance to the present. Particular emphasis is given to the arts, philosophy, religion and social conditions which have influenced the common cultural heritage of western civilization. Aspects of the culture of the non-western world included when appropriate. Students previously enrolled in HIST 252 not admitted.

HIST 155 Modern Business History. (3) Case studies of selected individuals in the business world are used to examine the history of the modern business system from the early modern period to the present. Equal attention to European origins and to the American evolution. Special emphasis on the history of modern corporations and bands and their relations with government and the rest of society.

HIST 201 Science and Technology in World History — Space/Time/Man/Woman. (3) Selected topics in the history of science and technology, emphasizing their interest and importance to the public. The topics are united by three main themes: (1) the development of space/time concepts of the universe in astronomy and physics; (2) communications and transportation; (3) the nature of man and woman, including biological, anthropological and psychological theories of race and sex differences.

HIST 217 Afro-American History. (3) A survey of the Negro in American history, covering the African background, slavery, the role of the Negro in the social, political, economic, cultural and artistic life of the United States. Emphasis will be placed on the enduring themes and the black experience in American society, including contemporary problems in race relations.

HIST 221 History of the United States to 1865. (3) A survey of the history of the United States from Colonial times to the end of the Civil War. Emphasis on the establishment and development of American institutions.

HIST 222 History of the United States Since 1865. (3) A survey of economic, social, intellectual, and political developments since the Civil War. Emphasis on the rise of industry and the emergence of the United States as a world power.

HIST 223 Social and Cultural History of Early America. (3) American social experience from Colonial times through the Civil War. The development of Colonial societies, the economic and religious bases of 18th century life, the social character of the Revolution, the growth of cities, rise of immigration, and maturation of economic enterprise in antebellum America, and the social causes and consequences of the Civil War.

HIST 224 Social and Cultural History of Modern America. (3) American social history from Civil War to the present. Examination of a network of social interaction accompanying the rise of male-dominated, business-oriented urban culture after the Civil War. Concentration of the major social forces clashing and cooperating to produce the modern United States: 'Business Republicanism', urban workers; intellectuals; rural populists; immigrants (especially Jewish); black-Americans; and struggling women liberators. The swift crosscurrents of a 'free-society' still wrestling with inherent contradictions of the democratic experiment begun in the American colonies some 350 years ago.

HIST 225 The United States in World Affairs. (3) A study of the United States as an emerging world power and the American response to changing status in world affairs. Emphasis on the relationship betwen internal and external development of the nation.

HIST 226 Women In American Society to 1865. (3) A survey of the religious, legal, and cultural institutions that shaped the role and character of women in American society. The historical role played by women in the growth and development of the nation and their ongoing struggle to achieve political, economic, and social equality is examined.

HIST 227 Women in American Society Since 1865. (3) A survey of the religious, legal, and cultural institutions that shaped the role and character of women in American society. The historical role played by women in the growth and development of the nation and their ongoing struggle to achieve political, economic and social equality is examined.

HIST 231 Latin American History I. (3) Latin America from pre-Columbian Indian cultures to the beginnings of the wars for independence (ca. 1810), covering cultural, political, social, and economic developments.

HIST 232 Latin American History II. (3) The republics of Latin America since independence, with special emphasis upon their social, economic, and cultural development as third world nations.

HIST 237 Russian Civilization. (3) An overview of Russian history stressing the main lines of development of the Russian state and the evolution of Russian culture to the present day

HIST 243 History of Relations Between Men and Women in Western Civilization. (3) A survey of relations between men and women, especially in the family, in western civilization from earliest times to the present.

HIST 253 History of England and Great Britain I. (3) The development of British life and institutions to 1485.

HIST 254 History of England and Great Britain II. (3) British history from the Tudors to the present. The Tudor reformations, English revolutions, industrialism, Victorian and 20th century reforms, and the growth and evolution of the British Empire.

HIST 256 Pre-Honors Colloquium in Early American History. (3) Selected reading in early American history with emphasis on independent discussion and writing. May be taken for credit by students exempt from American history. Permission of instructor required.

HIST 257 Pre-Honors Colloquium in Modern American History. (3) Selected readings in modern American history with emphasis on independent study, discussion and writing. May be taken for credit by students exempt from American history. Permission of instructor required.

HIST 261 East Asian Civilization I. (3) An interdisciplinary survey of the development of East Asian cultures. An historical approach drawing on all facets of East Asian traditional life, to gain an appreciation of the fascinatingly different and complex cultures of the area.

HIST 262 East Asian Civilization II. (3) A survey of the historical development of modern Asia since 1700. Primarily concerned with the efforts of East Asians to preserve their traditional cultures in the face of Western expansion in the eighteenth and nineteenth centuries, and their attempts to survive as nations in the twentieth century.

HIST 271 Islamic Civilization I. (3) Survey of Islamic civilization dealing with Islam as a religion and covering its major institutions. Begins with pre-Islamic Arabia and rise of Muhammad, emphasizing the life and political activities of the prophet of Islam, the basic tenets of Islam, and Islamic religious law. A survey of the sectarian development in early Islam is included.

HIST 272 Islamic Civilization II. (3) Survey of Islamic institutions, religious and political, dealing with the administration of the Muslim empire and examining the development of the judicial and executive branches of government. Within the framework of the religious institutions, the development of Islamic jurisprudence and theology are briefly discussed. A short survey of Islamic mysticism is included.

HIST 273 African Civilization. (3) A brief survey of the history of sub-Saharan Africa from prehistoric times to the end of the colonial era. Special focus on neolithic civilizations, major migrations and political and commercial developments in pre-colonial and colonial Africa.

HIST 298 Special Topics in History. (3)

HIST 325 The Russian Revolutions of 1917. (3) A close examination of the historical background, the doctrines, the immediate causes, the events, and the results of the February and October revolutions.

HIST 326 Women and Industrial Development. (3) Analysis of women's role in the industrial state. Emphasis on the process of industrialization and its effect on women's lives since the industrial revolution. Comparisons of women in industrial and non-industrial settings.

HIST 350 Modern Church History. (3) Introduction to major developments and problems of modern church history primarily in Europe from the 'waning' of the confessional age in the 17th and 18th centuries through the 20th century.

HIST 351 History of Religion in America. (3) A history of religion, religious movements, and churches in America from the early Colonial period to the present, with special attention to the relation of church and society.

HIST 389 Proseminar in Historical Writing. (3) Discussions and research papers designed to acquaint the student with the methods and problems of research and presentation. The student will be encouraged to examine those phases of history which he regards as his specialties.

HIST 395 Honors Colloquium. (3) Enrollment limited to students admitted by the departmental honors committee. Reading in sources and secondary work centering about the development of the modern world. Discussions of reading and written work in weekly seminar meetings.

HIST 396 Honors Colloquium. (3) Enrollment limited to students admitted by the departmental honors committee. Reading in sources and secondary work centering about the development of the modern world. Discussions of reading and written work in weekly seminar meetings.

HIST 398 Special Topics in History. (3)

HIST 399 Honors Thesis. (3) Limited to students who have completed HIST 395. Normally repeated for a total of six hours credit during the senior year by candidates for honors in history.

HIST 401 The Scientific Revolution — From Copernicus to Newton. (3) Analysis of major discoveries and theories in 16th and 17th century astronomy and physics. The background of ancient, medieval and Renaissance science; mathematical and philosophical aspects of the new theories; and the social context of science, especially in 17th century England. No prerequisites. (This is the first part of an integrated three-semester sequence covering a selected sequence of developments in the physical sciences from the 16th century to the present; see HIST 402 and PHYS 490 for continuation.)

HIST 402 The Development of Modern Physical Science — From Euler to Einstein. (3) The history of physics in the 18th and 19th centuries, including some of its connections with mathematics, technology, chemistry and planetary science. Emphasis on internal technical developments in physical theory, with some discussion of experimental, philosophical and sociological aspects. This is the second part of a three-semester sequence (HIST 401, HIST 402, PHYS 490); each part may be taken independently of the others. For HIST 402 the prerequisites are MATH 110 and PHYS 112 or 117, or equivalent competence in mathematics and physics.

HIST 403 History of Technology. (3) A survey course designed for junior, senior and graduate students with a solid base in either engineering or history; it will cover the time span from Greek antiquity to the First World War. Technology will be studied as a cultural force controlled by laws of its own and operating within a distinctive conceptual framework. The course will concentrate on the changing character of technology in history and on the interactions between technology and other cultural forces such as science, philosophy, art, material culture, and the economy.

HIST 404 History of Modern Biology. (3) The internal development of biology in the nineteenth and twentieth centuries, including evolution, cell theory, heredity and development, spontaneous generation, and mechanism-vitalism controversies. The philosophical aspects of the development of scientific knowledge and the interaction of biology with chemistry and physics.

HIST 405 History of Early Medicine: From Thaumaturgy and Theurgy to the 17th Century Theories. (3) A historical survey of the development of medicine in Europe and Asia from earliest times to the eighteenth century. Topics discussed include: primitive diseases, Egyptian, Chinese, Greek and medieval medicine, epidemics, surgical developments, the physician and the development of public health administration. Enrollment limited to upper division and graduate students.

HIST 406 History of the Emergence of Modern Medicine. (3) Prerequisite, junior standing. Development of modern medicine from the eighteenth century to the present with emphasis on the United States, including American Indian medicine, growth of medical professions, hospitals and public health facilities, surgery, clinical medicine, psychiatry and modern medical specialization.

HIST 408 Special Topics in Women's History. (3) In-depth study of selected topics on women in American society including such areas as women and the law, women and politics, the 'feminine mystique', and the 'new feminism'. May be repeated to a maximum of six semester hours.

HIST 440 The Eastern Orthodox Church — Its Cultural History. (3) A study of the development of the Christian church in the Near East and eastern Europe from the conversion of Constantine to the present. Emphasis will be on the relations between church and state in various periods and on the influence of Eastern Christianity on the cultures of traditionally Eastern Orthodox nations.

HIST 498 Special Topics in History. (3) May be repeated to a maximum of nine hours.

History, United States

HIUS 401 American Colonial History. (3) Colonial America from Jamestown to 1763. The establishment of the various colonies with emphasis on the reasons for the instability of Colonial society to 1689; the emergence of stable societies after 1689; the development of Colonial regionalism, political institutions,

social divisions, education, urban and frontier problems in the eighteenth century.

HIUS 402 The American Revolution. (3) The background and course of the American Revolution through the formation of the Constitution. Emphasis on the impact of the political movement and war years of the character of American society.

HIUS 403 The Formative Period in America, 1789-1824. (3) The evolution of the federal government, the origins of political parties, problems of foreign relations in an era of international conflict, beginning of the industrial revolution in America, and the birth of sectionalism.

HIUS 404 Economic History of the United States to 1865. (3) The development of the American economy from Columbus through the Civil War.

HIUS 405 Economic History of the United States after 1865. (3) The development of the American economy from the Civil War to the present.

HIUS 408 Topics in United States Social History. (3) A consideration of selected aspects of American society from Colonial times to the present. Special emphasis given to regionalism, immigration, nativism, minorities, urbanization, and social responses to technological changes. Since emphasis on topics may change from semester to semester, course may be repeated to a maximum of six credits if topics are different.

HIUS 410 The Middle Period of American History, 1824-1860. (3) An examination of the political history of the United States from Jackson to Lincoln with particular emphasis on the factors producing Jacksonian democracy, manifest destiny, the Whig Party, the anti-slavery movement, the Republican Party, and secession.

HIUS 411 The Civil War. (3) A detailed study of historical interpretations; the sectionalism, the forces, situations, and events that caused the war; and the process and impact of the war itself.

HIUS 412 Reconstruction and the New Nation, 1865-1896. (3) Problems of reconstruction in both South and North. Emergence of big business and industrial combinations. Problems of the farmer and laborer.

HIUS 413 The Progressive Period — The United States 1896-1919. (3) How the Wm. McKinley-T. Roosevelt-W. H. Taft-Woodrow Wilson administrations dealt with the trust, money, tariff, and black issues. World War I is treated briefly.

HIUS 414 Between the Wars — The United States 1919-1945. (3) The American way of life in the 1920's and 1930's, the Great Depression, New Deal, and a brief consideration of World War II.

HIUS 415 The United States Since World War II. (3) American history from the inauguration of Harry S. Truman to the present with emphasis upon politics and foreign relations, but with consideration of special topics such as radicalism, conservation, and labor.

HIUS 416 Blacks in American Life — 1865 to the Present. (3) The role of the black in America since slavery, with emphasis on twentieth century developments: the migration from farm to city; the growth of the civil rights movement; the race question as a national problem.

HIUS 420 History of the Old South. (3) The golden age of the Chesapeake, the institution of slavery, the frontier South, the antebellum plantation society, the development of regional identity and the experiment in independence.

HIUS 421 History of the New South. (3) The experience of defeat, the restructuring of Southern society, the impact of industrialization and the modern racial adjustment.

HIUS 422 Diplomatic History of the United States to 1898. (3) American foreign relations from the beginning of the American Revolution in 1775 through the Spanish-American War of 1898, including both international developments and domestic influences that contributed to American expansion in world affairs, and analyses of significant individuals active in American diplomacy and foreign policy.

HIUS 423 Diplomatic History of the United States since 1898. (3) American foreign relations in the twentieth century during the age of imperialism, World War I, the Great Depression, World War II, and the Cold War. A continuation of HIUS 422.

HIUS 424 History of Ideas in America to 1865. (3) The ideas, conflicts, myths, and realities that shaped American character and society from the first settlements to the Civil War.

HIUS 425 History of Ideas in American since 1865. (3) A continuation of HIUS 424.

HIUS 426 Constitutional History of the United States — from Colonial Origins to 1860. (3) The interaction of government, law, and politics in the constitutional system. The nature and purpose of constitutions and constitutionalism; the relationship between the Constitution and social forces and influences, the way in which constitutional principles, rules, ideas, and institutions affect events and are in turn affected by events. The origins of American politics and constitutionalism through the Constitutional Convention of 1787. Major constitutional problems such as the origins of judicial review, democratization of government, slavery in the territories and political system as a whole.

HIUS 427 Constitutional History of the United States — Since 1860. (3) American public law and government, with emphasis on the interaction of government, law, and politics. Emphasis on the political-constitutional system as a whole, rather than simply the development of constitutional law by the Supreme Court. Major crises in American government and politics such as Civil War, Reconstruction, the 1890's, and New Deal era, the civil disorders of the 1960's.

HIUS 430 History of Maryland. (3) Political, social and economic history of Maryland from seventeenth century to the present.

HIUS 432 A Cultural and Social History of the American Worker. (3) Examines the free American working class in terms of its composition; its myths and utopias; its social conditions; and its impact on American institutions.

HIUS 433 History of the American Frontier. (3) Major historical interpretation of the significance to the period of the trans-Allegheny West. Assesses the impact of the frontier experience on American history. Equal attention is given to political, economic, social and cultural problems associated with the development of the West. Indian culture, treatment of the Indians, and Indian-white relations are integrated into the course through readings and lectures.

HIUS 434 History of the American Frontier. (3) Exploration, settlement and development of the trans-Mississippi West. Assesses the impact of the frontier experience on American history. Equal attention is given to political, economic, social and cultural problems associated with the development of the West. Indian culture, treatment of the Indians, and Indian-white relations are integrated into the course through readings and lectures.

Health

HLTH 105 Science and Theory of Health. (2) A course concerned primarily with sound health knowledge, attitudes and behaviors as they apply to the individual. The major subjects dealt with in this course are: mental health and social adjustment; human reproduction and sex education; organic efficiency; ecology and health; and the need for health education and community action for health from local to world levels.

HLTH 106 Drug Use and Abuse. (3) An interdisciplinary analysis of contemporary drug issues and problems. The course will examine physiological, psychological, social, philosophical, historical, legal and health aspects of drug use and abuse. Special attention will be focused on those general motivations for drug use that attend life on the college campus.

HLTH 110 Orientation to Health Education. (1) This course explores the field of health education in both the school and the community from the point of view of the health educator. Professional preparation and career opportunities are considered.

HLTH 130 Introduction to Health. (3) Development of understanding and appreciation of the historic and significant purpose and place of each of the specialized health areas in general education. A study of the educational and personal requirements and opportunities of a career in each professional health area.

HLTH 140 Personal and Community Health. (3) Meaning and significance of physical, mental and social health as related to the individual and to society; important phases of national health problems; constructive methods of promoting health of the individual and the community; health problems young people encounter with special emphasis on health knowledge for future teachers.

HLTH 150 First Aid and Emergency Medical Services. (2) Lecture, demonstration and training in emergency care, including cardiopulmonary resuscitation, hemorrhage control, shock, poisons and bone injury treatment and childbirth. American Red Cross and Heart Association of Maryland certification awarded.

HLTH 260 Instructor's Course in First Aid. (2) Prerequisite, HLTH 150 or equivalent. Advanced consideration of first aid techniques: orientation to methods, techniques and teaching aids; practical classroom instruction required. Red Cross instructor's certification awarded.

HLTH 270 Safety Education. (3) Safety in the home, school and community. Safety education programs in the public schools.

HLTH 280 The Driver and His Characteristics. (3) Prerequisite, HLTH 270. The aim of this

course is to treat the driver behavior problem in its relation to many of the psychophysical factors and forces in the traffic environment that impinge upon the man behind the wheel.

HLTH 305 Driver Education and Traffic Safety I. (3) Prerequisites, HLTH 270, 280. This course is a study of the place of the automobile in modern life and deals with the fundamentals, principles, practices, and content of high school driver education and traffic safety. Laboratory experience consists of observation and experience in teaching beginners to drive in dual control cars and simulators. Course includes eight weeks of practice teaching.

HLTH 310 Introduction to the School Health Program. (2) Prerequisites, HLTH 105 or 140. This course deals with the aspects of school health: health environment, health services, and health education. The relationships of the school health program and the general education program are emphasized. The roles of teachers, administrators, health specialists, and others in related fields are discussed.

HLTH 340 Curriculum, Instruction and Observation. (3) Prerequisites, HLTH 140, 270, 310, 420. A course designed to provide directed observation and discussion, coordinating these experiences with those from previous methods courses in the development of curricula for health and physical education. The course is planned to prepare for student teaching which follows in the same semester. The observations will be made of health programs in junior and senior high schools. This course must be taken during the semester in which the student is doing student teaching.

HLTH 345 Driver Education and Traffic Safety II. (3) Prerequisites, HLTH 270, 280, 305, or their equivalents. Comprehensive programming for driver education; teaching to meet driving emergencies and winter conditions; resources and agencies; the teacher and driver education; consumer education, insurance and liability.

HLTH 365 Organization, Administration and Supervision of School Safety Education. (3) Prerequisites, HLTH 273, 280, 305, 345 or their equivalents. Designed for teachers, school administrators, college instructors, and others responsible for directing or supervising safety programs in the schools. Deals with the problems, policies, practices, and procedures involved in the organization, administration and the supervision of a comprehensive accident prevention and safety education program for the schools. Considers integration factors of the school safety programs with the special emphasis on traffic programs.

HLTH 375 Problems in Driver and Traffic Safety Education. (3) Prerequisites, HLTH 270, 280, 305, 345 or their equivalents. An advanced course which gives consideration to the individual problems encountered in teaching driver and safety education. The psychology of teaching and learning are emphasized. Consideration is given to implications of emotion and attitude factors in driver and traffic education. The course includes an examination of existing courses of study, research, supervisory and evaluation practices.

HLTH 390 Organization and Administration of School Health Programs. (3) The three major aspects of the school health program are considered. Problems connected with health services, health instruction, and the health aspects of the school environment are discussed. The responsibilities of school personnel are delineated with emphasis on the role of the administrator.

HLTH 420 Methods and Materials in Health Education. (3) Prerequisites, HLTH 105 or 140, 310 or consent of instructor. The purpose of this course is to present the interrelationships of curriculum planning, methodology and the selection and use of teaching aids and materials. Special problems associated with health teaching are discussed. Students will become familiar with a variety of resources as well as planning for and presenting demonstration lessons.

HLTH 450 Health Problems of Children and Youth. (3) This course involves a study of the health needs and problems of pupils from the primary grades through high school. Physical, mental and psychosomatic aspects of health are considered in relation to the developmental and school levels. Consideration is given to such topics as diet selection and control; exercise, recreation and rest; emotional upset and its implications; and psychosexual development and problems. The role of the teacher and parent in encouraging optimal health is emphasized.

HLTH 455 Physical Fitness of the Individual. (3) A study of the major physical fitness problems confronting the adult in modern society. Consideration is given to the scientific appraisal, development and maintenance of fitness at all age levels. Such problems as obesity, weight reduction, chronic fatigue, posture, and special exercise programs are explored. This course is open to persons outside the fields of physical education and health.

HLTH 456 Health Problems of the Aging and the Aged. (3) Psychological, physiological, and socio-economic aspects of aging; nutrition; sexuality; death, dying, and bereavement; self actualization and creativity; health needs and crises of the aged.

HLTH 460 Problems in School Health Education in Elementary and Secondary Schools. (2-6) This is a workshop type course designed particularly for inservice teachers to acquaint them with the best methods of providing good health services, healthful environment and health instruction.

HLTH 470 The Health Program in the Elementary School. (3) Prerequisites, HLTH 105 or 140; 310. This course, designed for the elementary school classroom teacher, analyzes biological and sociological factors which determine the health status and needs of the individual elementary school child. The various aspects of the school program are evaluated in terms of their role in health education. The total school health program is surveyed from the standpoint of organization and administration, and health appraisal. Emphasis is placed upon modern methods and current materials in health instruction. (The State Department of Education accepts this course for biological science credit.)

HLTH 471 Women's Health. (3) The women's health movement from the perspective of consumerism and feminism. The physician-patient relationship in the gynecological and other medical settings. The gynecological exam, gynecological problems, contraception, abortion, pregnancy, breast and cervical cancer and surgical procedures. Psychological aspects of gynecological concerns.

HLTH 476 Death Education. (3) The course aims to enable students to better understand aspects of dying so that (1) the quality of their health and living is enhanced and (2) they are better able to help the bereaved, and the dying. The genesis and development of our present day attitudes and behavior are examined using a multi-disciplinary and life cycle approach. A field trip and extensive reading and comprehensive research report are required.

HLTH 477 Fundamentals of Sex Education. (3) This course is concerned with basic information regarding the physical, psychological, social, historical, semantic and comparative cultural aspects of sex. The adjustment needs and problems of children and adults during the course of maturing and aging are studied; and special consideration is given to the sex education program in schools.

HLTH 480 Measurement in Health. (3) Two lectures and two laboratory periods per week. The application of the principles and techniques of educational measurement to the teaching of health and physical education; study of functions and techniques of measurements in the evaluation of student progress toward the objectives of health and physical education, and in the evaluation of the effectiveness of teaching.

HLTH 487 Health and Developmental Programs for the Aged. (3) Prerequisite, at least junior standing in health and special permission of the instructor. Training and experience in a clinically oriented development program for the aged.

HLTH 488 Children's Health and Developmental Clinic. (1-4) Prerequisite, at least junior standing in health, physical education and recreation, or by special permission of the director. An opportunity to acquire training and experience in a therapeutically oriented physical education-recreation program for children referred by various education, special education, medical and psychiatric groups. Repeatable to a maximum of 4 hours.

HLTH 489 Field Laboratory Projects and Workshop. (1-6) A course designed to meet the needs of persons in the field with respect to workshop and research projects in special areas of knowledge not covered by regularly structured courses. Note: the maximum total number of credits that may be earned toward any degree in physical education, recreation, or health education under PHED, RECR, HLTH or EDUC is six.

Honors

HONR 100 Honors Orientation Colloquium. (3) A multi-sectioned colloquium on current topics in the humanities, the natural sciences and the social sciences. The topics will vary with the interest of the instructors. Writing on, and in-class discussions of, assigned reading will be stressed. Ordinarily taken by all general honors freshmen. Open to other students with the consent of the director of honors.

HONR 339 Seminar in the Social Sciences. (1-4) A series of seminars in the social sciences. Often interdisciplinary in character and often team-taught. The subjects of the seminars and the faculty may vary from semester to semester. Seminars may be repeated for credit, with the permission of the director of honors, if the content of the course alters appreciably. Open to general and departmental honors students and to other

students with the consent of the instructor and the director of honors.

HONR 349 Seminar in the Natural Sciences. (1-4) A series of seminars in the natural sciences. Often interdisciplinary in character and often team-taught. The subjects of the seminars and the faculty may vary from semester to semester. Seminar may be repeated for credit, with the permission of the director of honors, if the content of the course alters appreciably. Open to general and departmental honors students and to other students with the consent of the instructor and the director of honors.

HONR 359 Seminar in the Humanities. (1-3) A series of seminars in the humanities. Often interdisciplinary in character and often team-taught. The subjects of the seminars and the faculty may vary from semester to semester. Seminar may be repeated for credit, with the permission of the director of honors, if the content of the course alters appreciably. Open to general and departmental honors students and to other students with the consent of the instructor and the director of honors.

HONR 360 Honors Thesis Research. (3) A thesis preparation course for general honors students under the direction of individual faculty members. HONR 360 or 379, but not both, may be used once to fulfill the general honors seminar requirement. Graded pass-fail. May not be repeated. Open only to general honors students.

HONR 379 Honors Independent Study. (1-6) Honors independent study involves reading or research, directed by individual faculty, especially in areas outside of student's major. HONR 379 or 360 but not both, may be used once to fulfill the general honors seminar requirement. Graded pass-fail. May be repeated to a maximum of twelve hours. Open only to general honors students.

Horticulture

HORT 111 Tree Fruit Production. (3) Prerequisite, BOTN 100. Two lectures and one laboratory per week. A detailed study of the principles and practices in fruit production, harvesting and storage, with emphasis on the apple. One field trip required.

HORT 112 Tree Fruit Production. (2) Two lectures per week. Prerequisite, HORT 111. A study of the principles and practices in fruit production, harvesting, and handling of deciduous tree fruit crops other than the apple.

HORT 132 Garden Management. (2) Two lectures per week. Prerequisite, BOTN 100. The planting and care of ornamental plants on the home grounds and a study of commonly used species of annuals and hervaceous perennials.

HORT 142 Garden Management Laboratory. (1) One two-hour laboratory per week. Prerequisite or concurrent, HORT 132. Demonstration and application of practices in the production and maintenance of garden plants.

HORT 160 Introduction to the Art of Landscaping. (3) Three lectures per week. The theory and general principles of landscaping design with their application to public and private areas.

HORT 171 Elements of Forestry. (3) Two lectures per week. Prerequisite, BOTN 100. A general survey of the field of forestry, including timber values, conservation, protection, silviculture, utilization, mensuration, engineering, recreation and lumbering. Principles and practices of woodland management. Four all-day Saturday field trips are required.

HORT 212 Berry Production. (3) Two lectures and one laboratory period a week. Prerequisite, BOTN 100. A study of the principles and practices involved in the production of small fruits including grapes, strawberries, raspberries, blackberries, and cranberries.

HORT 222 Vegetable Production. (3) Two lectures and one laboratory period a week. Prerequisite, BOTN 100. A study of principles and practices of commercial vegetable production.

HORT 231 Greenhouse Management. (3) Three lectures per week. Prerequisite, BOTN 100. A study of the construction and operation of structures for forcing horticultural crops and the principles underlying the regulation of growth under greenhouse conditions.

HORT 232 Flower Store Management. (3) Two lectures and one laboratory period a week. Prerequisite, HORT 231. A study of the operation and management of a flower store. Laboratory period devoted to principles and practice of floral arrangements and decoration.

HORT 241 Greenhouse Crop Production Laboratory. (1) One laboratory per week. Prerequisite or concurrent, HORT 231. Demonstration and application of practices in the commercial production of greenhouse crops.

HORT 242 Greenhouse Crop Production Laboratory. (1) One laboratory per week. Prerequisite, HORT 231. Demonstration and application of practices in the commercial production of greenhouse crops.

HORT 260 Basic Landscape Composition. (2) Two laboratory periods per week. The introduction of landscaping presentation technique, supplemented by problems in basic composition.

HORT 271 Plant Propagation. (3) Three lectures per week. Prerequisite, BOTN 100. A study of the principles and practices in the propagation of plants.

HORT 274 Genetics of Cultivated Plants. (3) Three lectures per week. Prerequisite, BOTN 100. Principles of plant genetics in relation to plant breeding. Some of the topics presented are meiosis, simple Mendelian genetics, gene interaction, linkage and crossing over, cytoplasmic and quantitative inheritance, mutations, and the role of DNA.

HORT 361 Principles of Landscape Design. (3) One lecture and two laboratory periods per week. Prerequisite, HORT 160 and 260. A consideration of design criteria and procedure as applied to residential properties.

HORT 362 Advanced Landscape Design. (3) One lecture and two laboratory periods per week. Prerequisite, HORT 361. Prerequisite or concurrent, HORT 454. The design of public and private areas with the major emphasis on plant materials.

HORT 364 Landscape Construction. (3) One lecture and two laboratory periods per week. Prerequisite, HORT 361. An introductory study and application of location methods, construction details, and construction techniques of the various landscape objects such as walks, benches, roads.

HORT 398 Seminar. (1) Oral presentation of the results of investigational work by reviewing recent scientific literature in the various phases of horticulture.

HORT 399 Special Problems. (2) Credit arranged according to work done. For major students in horticulture or botany. Four credits maximum per student.

HORT 411 Technology of Fruits. (3) Three lectures per week. Prerequisite, HORT 112, Prerequisite or concurrent BOTN 441. A critical analysis of research work and application of the principles of plant physiology, chemistry, and botany to practical problems in commercial production.

HORT 417 Tree and Small Fruit Management. (1) Primarily designed for vocational agriculture teachers and extension agents. Special emphasis will be placed upon new and improved commercial methods of production of the leading tree and small fruit crops. Current problems and their solution will receive special attention.

HORT 422 Technology of Vegetables. (3) Three lectures per week. Prerequisite, HORT 222, prerequisite or concurrent, BOTN 441. A critical analysis of research work and application of principles of plant physiology, chemistry, and botany to practical problems in commercial vegetable production.

HORT 427 Truck Crop Management. (1) Primarily designed for teachers of vocational agriculture and extension agents. Special emphasis will be placed upon new and improved methods of production of the leading truck crops. Current problems and their solutions will receive special attention.

HORT 432 Fundamentals of Greenhouse Crop Production. (3) Three lectures per week. Prerequisite, HORT 231. This course deals with a study of the commercial production and marketing of ornamental plant crops under greenhouse, plastic houses and out-of-door conditions.

HORT 451 Technology of Ornamentals. (3) Three lectures per week. Prerequisite or concurrent BOTN 441. A study of the physiological processes of the plant as related to the growth, flowering and storage of ornamental plants.

HORT 453 Woody Plant Materials. (3) Prerequisite, BOTN 212. A field and laboratory study of trees, shrubs, and vines used in ornamental plantings.

HORT 454 Woody Plant Materials. (3) Prerequisite, BOTN 212. A field and laboratory study of trees, shrubs, and vines used in ornamental plantings.

HORT 456 Production and Maintenance of Woody Plants. (3) Two lectures and one laboratory period a week. Prerequisite or corequisite, HORT 271, 454. A study of the production methods and operation of a commercial nursery and the planting and care of woody plants in the landscape.

HORT 457 Ornamental Horticulture. (1) A course designed for teachers of agriculture and extension agents to place special emphasis on problems of the culture and use of ornamental plants.

HORT 471 Systematic Horticulture. (3) Two lectures and one laboratory period a week. A study of the origin, taxonomic relationship and horticultural classification of fruits and vegetables.

HORT 474 Physiology of Maturation and Storage of Horticultural Crops. (2) Two lectures a week. Prerequisite, BOTN 441. Factors related to maturation and application

of scientific principles to handling and storage of horticultural crops.

HORT 489 Special Topics in Horticulture. (1-3) Credit according to time scheduled and organization of course. A lecture and/or laboratory series organized to study in depth a selected phase of horticulture not covered by existing courses.

Housing and Applied Design

HSAD 240 Design and Furnishings in the Home. (3) Three lectures a week. Prerequisite, APDS 101 or 104. Designed to meet need for basic information and competency in choice and arrangement of home furnishings. For non-majors only.

HSAD 241 Family Housing. (3) Housing and its relationship to family living. A study of factors which shape housing design; investigation of group and individual housing needs and values.

HSAD 246 Materials of Interior Design. (3) Prerequisite, consent of instructor. Investigation of materials and construction characteristics of interior architecture and furnishings. Emphasis on use, limitations, sources, directions in current research.

HSAD 340 Period Homes and Their Furnishings. (3) Prerequisites, APDS 101, HSAD 246, or equivalent. A study of authentic interiors and furnishings. Exploration of style influences apparent in contemporarily produced items.

HSAD 341 Contemporary Developments in Architecture, Interiors, Furnishings. (3) Prerequisite, HSAD 246 and consent of instructor. Style origins and development of twentieth century architecture as living space. Architects, designers, trends, philosophy of relationship of interior space to furnishings.

HSAD 342 Space Development. (3) One lecture, 2 two-hour studios. Prerequisites, APDS 101, 102, 103, EDIN 101A, or equivalent. A study of blueprints and house construction as they relate to the interior designer. Development and drafting of original plans emphasizing the functional spatial relationship of furnishings to interiors.

HSAD 343 Interior Design I. (3) One lecture-discussion, two studio periods. Prerequisites, APDS 101, EDIN 210, or equivalent. Complete presentation of rooms; isometric and perspective projections rendered in color; purchase and work orders. Emphasis on individual and family living space.

HSAD 344 Interior Design II. (3) One lecture-discussion, two studio periods. Prerequisite, HSAD 343. Continuation of HSAD 343 with emphasis on commercial and contract assignments.

HSAD 345 Professional Aspects of Interior Design. (3) One lecture plus work experience. Professional orientation, ethics, and practices.

HSAD 380 Professional Seminar. (2) Two lecture discussion periods. Prerequisite, junior standing and consent of instructor. Exploration of professional and career opportunities, ethics, practices, professional organizations. Portfolio evaluation.

HSAD 440 Interior Design III. (4) Eight hours studio periods. Prerequisite, HSAD 344. Preparation of complete presentation; work specifications, floor plans, purchase orders, renderings, etc. Portfolio preparation.

HSAD 441 Interior Design IV. (4) Eight hours studio periods. Prerequisite, HSAD 440. Preparation of complete presentation: work specifications, floor plans, purchase orders, renderings, etc. Portfolio preparation.

HSAD 442 Readings in Housing. (3) Seminar. Prerequisites, SOCY 100, HSAD 241, senior standing. To satisfy individual interests and needs, opportunity afforded for concentrated reading on one or more facets of housing (urban renewal, public housing, etc.). Examination of completed research, needed future research.

HSAD 488 Selected Topics in Housing and Interior Design. (1-6) Offered on demand. May be repeated to a maximum of six hours.

HSAD 499 Individual Study in Housing and/or Interior Design. (3-4) Guidance for the advanced student capable of independent subject matter investigation or creative work. Problem chosen with consent of instructor.

Institution Administration.

IADM 300 Food Service Organization and Management. (3) Introduction to the food services, principles of organization, management. Financial control, and technical operations. Records, reports and organization charts included.

IADM 350 Practicum in Institution Administration. (3) Prerequisites, five credits in IADM and consent of department. Inservice training and practical experience, totaling at least 240 hours, in an approved food service.

IADM 410 School Food Service. (3) Two lectures and one morning a week for field experience in a school food service. Prerequisite, FOOD 200, or 240 and 250, and NUTR 300, or consent of instructor. Study of organization and management, menu planning, food purchasing, preparation, service, and cost control in a school lunch program.

IADM 420 Quantity Food Purchasing. (2) Prerequisites, FOOD 240 and IADM 300, or consent of instructor. Food selection and the development of integrated purchasing programs. Standards of quality; marketing distribution systems.

IADM 430 Quantity Food Production. (4) Two hours of lecture and one six-hour laboratory a week. Prerequisites, FOOD 240 and IADM 300, or consent of instructor. Scientific principles and procedures. Laboratory experience in management techniques and in quantity food production and service.

IADM 440 Food Service Personnel Administration. (2) Prerequisite, IADM 300. Principles of personnel administration in food services, emphasis on personnel selection, supervision and training, job evaluation, wage and payroll structure, current labor regulations, and interpersonal relationships and communications.

IADM 450 Food Service Equipment and Planning. (2) Two lectures a week. Prerequisite, consent of instructor. Equipment design selection, maintenance and efficient layout, relation of the physical facility to production and service.

IADM 460 Administrative Dietetics I. (3) Open only to students accepted into and participating in the U.S. Army dietetic internship program at Walter Reed General Hospital or the coordinated undergraduate dietetics program. Application of management theory through guided experience in all aspects of hospital dietary department administration. For students in the coordinated undergraduate dietetics program, 238 hours of hospital food service management experience is required and this course must be accompanied by IADM 300 and 430.

IADM 470 Administrative Dietetics II. (3) Open only to students accepted into and participating in the U.S. Army dietetic internship program at Walter Reed General Hospital or the coordinated undergraduate dietetics program. Continuation of IADM 460. For students in the coordinated undergraduate program, 238 hours of food service experience is required and this course must be accompanied by IADM 420 and 440.

IADM 490 Special Problems in Food Service. (2-3) Prerequisites, senior standing, five hours in IADM courses and consent of instructor. Individual selected problems in the area of food service.

IADM 498 Special Topics. (1-3) Prerequisite, consent of instructor. Selected current aspects of institution administration. Repeatable to a maximum of six credits if the subject matter is substantially different.

Information Systems Management

IFSM 401 Electronic Data Processing. (3) Prerequisites, junior standing, MATH 111 or the equivalent. The electronic digital computer and its use as a tool in processing data. The course includes the following areas: (1) organization of data processing systems, (2) environmental aspects of computer systems (3) management control problems and potentials inherent in mechanized data processing systems.

IFSM 402 Electronic Data Processing Applications. (3) Prerequisite, IFSM 401 or consent of instructor. Intensive study of computer applications using a problem-oriented language. Introduction of computer methods for the solution of organizational problems. Laboratory exercises in programming and development of computer techniques.

IFSM 410 Information Processing Problems of Models of Administrative, Economic and Political Systems. (3) Prerequisites, MATH 141 or equivalent; IFSM 402, BMGT 231, and some familiarity with administrative, economic and/or political models. Prerequisites may be waived with the consent of instructor. Data processing requirements underlying the creation and maintenance of a data base to be used in estimating the parameters of socio-economic models. An analysis of the structure and development of recent socio-economic models as relevant to data processing considerations. Extractions and preparation of data from the data base to facilitate the appropriate transformation necessary for model construction and also to minimize the processing cost of data in-put. The course draws upon a knowledge of models of administrative, economic and political systems. Case studies and experience with data processing for selected models are included.

IFSM 420 Information Processing and Computational Problems in Operations Analysis. (3) Prerequisites, MATH 141 or equivalent; IFSM 402, and a course in statistics, such as BMGT 430, dealing with multivariate models. Prerequisites may be waived with the consent of the instructor. Implementation of applications requiring the integration of data processing and analytical

programming techniques. Such applications feature the calculation of various statistical estimates of the parameters in a multivariate model within the context of a file maintenance problem (e.g., the writing of a matrix inversion routine for revenue forecasting within a master updating program or sales forecasting and/or sales performance evaluation within a sales transaction-master updating program). A universal, problem-oriented language such as Cobol will be used with strong emphasis on the use of the mathematical Fortran IV library subroutines. Class projects include case studies and solutions of problems using real-world data.

IFSM 436 Introduction to Systems Analysis. (3) Prerequisites, IFSM 102, BMGT 330, MATH 141, or the equivalent. Prerequisites may be waived with consent of instructor. The use of the computer in the management and operation of organizations. The course includes the following areas: (1) the principles of systems analysis, (2) recent applications and innovations of the systems concept, (3) design and implementation of computer systems, including such techniques as mathematical programming, simulation, business games and network analysis, and (4) laboratory use of a digital computer in the application of these techniques.

Italian

ITAL 101 Elementary Italian. (4) Introduction to basic grammar and vocabulary; written and oral work. Four recitations per week, plus one drill period, during which oral skills are emphasized.

ITAL 102 Elementary Italian. (4) Completion of study of basic grammar; written and oral work, with an increasing emphasis on spoken Italian. Four recitations per week, plus one drill period stressing conversational skills.

ITAL 104 Intermediate Italian. (4) Review of Italian grammar; extensive reading, discussion, and composition. Four recitations per week, plus one drill period stressing conversational skills. Fulfills the language requirement.

ITAL 111 Elementary Italian. (3) Three recitations and one laboratory hour per week. Elements of grammar and exercises in translation.

ITAL 112 Elementary Italian. (3) Three recitations and one laboratory hour per week. Elements of grammar and exercises in translation.

ITAL 114 Intermediate Italian. (3) Three recitations per week. Prerequisite, ITAL 112 or equivalent. Reading of texts designed to give some knowledge of Italian life, thought and culture.

ITAL 115 Intermediate Italian. (3) Three recitations per week. Prerequisite, ITAL 112 or equivalent. Reading of texts designed to give some knowledge of Italian life, thought and culture.

ITAL 121 Accelerated Italian I. (3) An intensive beginning course in Italian language skills: guided practice in reading and writing, understanding the spoken language and conversation, to enable the student to move more quickly to advanced courses. Restricted to students already having a good background in at least one other foreign language (successful completion of level 4 in high school, or of 115 or 104 or equivalent at the university level; or through linguistic competence acquired by residence abroad, or by demonstration of equivalent proficiency). With 122, may be used to satisfy language requirements.

ITAL 122 Accelerated Italian II. (3) Prerequisite, ITAL 121. An intensive beginning course in Italian language skills: guided practice in reading and writing, understanding the spoken language and conversation, to enable the student to move more quickly to advanced courses. May be used to satisfy language requirements.

ITAL 201 Conversation and Composition. (3) Prerequisite, ITAL 104 or 115. A practical language course recommended for all students continuing in Italian. May be taken concurrently with ITAL 251.

ITAL 251 Introduction to Italian Literature. (3) Prerequisite, ITAL 104 or 115. Required of all students who continue in advanced courses of the department with the exception of superior students who are permitted to bypass an introduction to Italian literature. Conducted in Italian. Reading of literary texts, discussion and brief essays.

ITAL 279 Readings in Italian Literature in Translation. (3) Topic to be determined each semester. All readings, discussions and examinations in English. No prerequisites. Repeatable for a maximum of 6 credits.

ITAL 301 Advanced Conversation and Composition. (3) Prerequisite, ITAL 201 or consent of instructor. Written and oral work, grammar review and practice, designed to better the student's abilities to write and speak fluently and correctly.

ITAL 351 Survey of Italian Literature. (3) Prerequisite, ITAL 115 or equivalent. Basic survey of history of Italian literature.

ITAL 352 Survey of Italian Literature. (3) Prerequisite, ITAL 115 or equivalent. Basic survey of history of Italian literature.

ITAL 410 The Italian Renaissance. (3) A study of major trends of thought in Renaissance literature, philosophy, art, and science.

ITAL 498 Special Topics in Italian Literature. (3) Repeatable for a maximum of six credits.

ITAL 499 Special Topics in Italian Studies. (3) An aspect of Italian studies, the specific topic to be announced each time the course is offered. Repeatable for a maximum of 6 credits.

Individual Studies Program

IVSP 318 Individual Studies. (1-15) Prior permission of the administrative dean for undergraduate studies required. This course may be used by students in the individual studies program to establish credit in approved informal educational experiences such as independent studies, special problems, or work-study experience.

IVSP 319 Tutorial Report. (1) A written analysis of progress toward completion of degree requirements. Limited to students in the individual studies program.

IVSP 320 Bachelor's Report. (3) Required of all students in the individual studies program whose program includes 40% or more of informal educational experience (independent study, special problems, work internship, etc.) and is strongly recommended for all students in the program. This paper is to be completed in the student's final semester and approved by the tutor and committee prior to certification for the degree.

Japanese

JAPN 101 Elementary Japanese. (4) Three meetings of class and two laboratory or drill sessions per week. Introduction to Japanese grammar and the written and spoken language, including ideographs and phonetic symbols.

JAPN 102 Elementary Japanese. (4) Three meetings of class and two laboratory or drill sessions per week. Introduction to Japanese grammar and the written and spoken language, including ideographs and phonetic symbols.

JAPN 104 Intermediate Japanese. (4) Three meetings of class and one laboratory or drill session per week. Continuation of Japanese grammar and the written and spoken language, including more advanced ideographs and idioms and introduction to readings from actual Japanese sources.

Journalism

JOUR 200 Introduction to Mass Communication. (3) Survey of the processes and effects of mass communication; historical development and social, economic, legal, and professional aspects of the mass media. Open to all students.

JOUR 201 Writing for Mass Media. (3) Prerequisite, ENGL 101 and JOUR 200, and 30 WPM typing ability. Introduction to news, feature and publicity writing for the printed and electronic media; development of news concepts; laboratory in news gathering and writing skills.

JOUR 310 News Editing. (3) Principles of the editing process and practice in copy editing, headline writing, newspaper page layout, and editorial judgment. Prerequisites, JOUR 200 and 201.

JOUR 320 News Reporting. (3) Principles and practices of news reporting, with special emphasis on news gathering for all the media; covering news beats and other news sources, including researching a news story for accuracy, comprehensiveness and interpretation. Prerequisites, JOUR 200 and 201.

JOUR 321 Reporting of Public Affairs. (3) Advanced training in writing news for publication in specialized areas, particularly city, county, and federal news. Students meet in seminar with news sources and leading news reporters and work in Washington, D.C., Annapolis, and Baltimore in covering news in depth for publication. Prerequisites, JOUR 320 and permission of the instructor.

JOUR 330 Public Relations Theory. (3) Prerequisites, JOUR 200 and 201. Study of the historical development and contemporary status of public relations in business, government, associations and other organizations. Application of communication theory and social science methods to the research, planning, communication and evaluation aspects of the public relations process.

JOUR 331 Public Relations Techniques. (3) Prerequisite, JOUR 330. Review of the techniques of public relations including news releases, publications and printed materials, audio-visual techniques, speeches and special events. Application of these techniques in laboratory and field projects.

JOUR 332 Practicum in Public Relations. (1) Prerequisite, JOUR 330. Organized, supervised field experience in public relations. Individual

projects coordinated by faculty and public relations professionals. Must be taken concurrently with JOUR 331.

JOUR 333 Organizational Communication in Public Relations. (3) Prerequisite, JOUR 201. Theory and techniques for planning and producing organizational publications and internal communication programs. Theories of organizational communication, principles of layout and design, non-print communication media, and methods of pre-testing and evaluating communications programs.

JOUR 340 Principles of Typography and Production. (3) Study of layout, typography, design, and printing in the planning and production of the printed media. Prerequisites, JOUR 200 and 201.

JOUR 341 Advertising Copy and Layout. (3) Theory and practice in advertising copy and layout, with emphasis on newspaper advertising, for letterpress and photo-offset printing. Use of illustrations, type selection, copy-fitting, media selection. Prerequisites, JOUR 200 and 201.

JOUR 350 Photojournalism. (3) Prerequisites, JOUR 200 and 201. Fundamentals of camera operation and darkroom procedures, including developing and printing black and white still photographs for communications media. Department furnishes equipment and student furnishes supplies.

JOUR 351 Advanced Photojournalism. (3) Prerequisite, JOUR 350. Analysis of the role of photography in mass communication, with emphasis on the photographic essay, and use of the 35 mm camera. Students provide 35 mm equipment and supplies.

JOUR 352 Special Topics in Photojournalism. (3) Prerequisites, JOUR 351 and consent of instructor. An analysis of the theory and application of advanced photographic processes to the communication of ideas, including direct audience communication, realistic and nonrealistic visual materials and media.

JOUR 360 Broadcast News Writing. (3) Study of and practice in the special application of news writing and editing to the broadcasting media, including the use of wire copy and tape recorders in producing newscasts. Prerequisites, JOUR 320 and 321.

JOUR 361 Reporting Through Audio-Visual Media. (3) Principles of live photography and recording in the production of news and documentaries for all the media. Prerequisites, JOUR 350 and 360.

JOUR 370 Editing Industrial Publications. (3) Prerequisites, JOUR 200 and 201. Industrial communications; management and production of company periodicals; public relations aspects of industrial journalism.

JOUR 371 Magazine Article and Feature Writing. (3) Study of types of feature articles, particularly for the magazine market, analysis of the magazine medium and specialized audiences; practice in researching and writing the feature article; analysis of free-lance markets. Prerequisites, JOUR 200 and 201.

JOUR 380 Journalism for Science and Technology. (3) Study and practice of the basic techniques of writing and editing scientific and technical material for both the general audience and the specialist. Prerequisites, JOUR 200 and 201.

JOUR 390 News Commentary and Critical Writing. (3) Prerequisite, JOUR 320. Study and practice of journalistic interpretation and analysis, editorial writing, and critical writing.

JOUR 400 Law of Mass Communication. (3) Study of the legal rights and constraints of mass media; libel, privacy, copyright, monopoly, and contempt, and other aspects of the law applied to mass communication. Previous study of the law not required. Prerequisites, JOUR 200 and 201.

JOUR 410 History of Mass Communication. (3) Study of the development of newspapers, magazines, radio, television, and motion pictures as media of mass communication. Analysis of the influences of the media on the historical development of America. Prerequisites, JOUR 200 and 201.

JOUR 420 Government and Mass Communication. (3) Study of the relationship between the news media and government. Analysis of media coverage of government and politics. Study of governmental and political information and persuasion techniques. Prerequisites, JOUR 200 and 201.

JOUR 430 Comparative Mass Communication Systems. (3) Survey of the history and status of the mass media throughout the world; comparative analysis of the role of the press in different societies. Prerequisites, JOUR 200 and 201 or consent of instructor for non-majors.

JOUR 440 Public Opinion and Mass Communication. (3) Prerequisites, JOUR 200 and 201. Study of publics and their interrelationships in the formation of public opinion; measurement of public opinion and media habits; role of the mass media in the formation of public opinion.

JOUR 459 Special Topics in Mass Communication. (3) Issues of special concern and current interest. Open to all students. Repeatable to a maximum of six credits provided the topic differs.

JOUR 490 Seminar in Journalism. (3) Seminar for journalism seniors in newsroom problems and policies, emphasizing ethics and responsibilities; in cooperation with the Baltimore *Sun*, Baltimore *News-American*, and other area news media. Prerequisite, permission of the instructor.

JOUR 497 Professional Seminar. (3) Prerequisites, JOUR 200, JOUR 201 and consent of instructor. Projects and discussions relating professional work experience to the study of journalism. Limited to students who participated in an approved summer work experience after the junior year.

JOUR 499 Independent Study. (1-3) Individual projects in journalism. May be repeated to a maximum of three hours.

Latin

LATN 101 Elementary Latin. (3) A student who has had two units of Latin in high school may register for LATN 101 for purposes of review, but ordinarily not for credit.

LATN 102 Elementary Latin. (3) A student who has had two units of Latin in high school may register for LATN 102 for credit with departmental permission.

LATN 170 Greek and Roman Mythology. (3) Taught in English. No prerequisite, cannot be taken for language credit. This course is particularly recommended for students planning to major in foreign languages, English, history, the fine arts, or journalism.

LATN 203 Intermediate Latin (Caesar). (3) Prerequisite, LATN 101, 102 or equivalent.

LATN 204 Intermediate Latin (Cicero). (3) Prerequisite, LATN 203 or equivalent.

LATN 305 Vergil's Aeneid. (3) Prerequisite, LATN 204 or equivalent.

LATN 351 Horace. (3) Prerequisite, LATN 305 or equivalent.

LATN 352 Livy. (3) Prerequisite, LATN 351 or equivalent.

LATN 361 Pliny's Letters. (3) Prerequisite, LATN 352 or equivalent.

LATN 370 Latin Literature in Translation. (3) Selections in translation of Latin literature to the time of Apuleius. Special emphasis will be placed on poetry of the Augustan age. No knowledge of Latin is required. Cannot be counted towards a major in Latin.

LATN 400 Level Course Prerequisite: LATN 361

LATN 401 Catullus and the Roman Elegiac Poets. (3)

LATN 402 Tacitus. (3)

LATN 403 Roman Satire. (3)

LATN 404 Roman Comedy. (3)

LATN 405 Lucretius. (3)

LATN 411 Advanced Latin Grammar. (3) Prerequisite, three years of college Latin or equivalent. An intensive study of the morphology and syntax of the Latin language supplemented by rapid reading.

LATN 499 Latin Readings. (3) Prerequisite, consent of instructor. The reading of one or more selected Latin authors from antiquity through the Renaissance. Reports. May be repeated with different content.

Library Science

LBSC 499 Workshops, Clinics, and Institutes. (1-9) Workshops, clinics, and institutes developed around specific topics or problems primarily for practicing librarians. Repeatable to a maximum of nine credit hours.

Institute of Criminal Justice and Criminology

LENF 100 Introduction to Law Enforcement. (3) Introduction to the administration of criminal justice in a democratic society with emphasis upon the theoretical and historical development of law enforcement. The principles of organization and administration of law enforcement; functions and specific activities; planning and research; public relations; personnel and training; inspection and control; direction; policy formulation.

LENF 220 Investigation in Law Enforcement. (3) Investigation as a process of communication. Principles and problems in information collection and evaluation; impartial gathering and evaluation of data, crime scene search and recording; collection and preservation of physical evidence; scientific aids; modus operandi; sources of information; interviewing; follow-up and case preparation.

LENF 230 Criminal Law in Action. (3) Law as one of the methods of social control. Criminal law: its nature, sources, and types; theories and historical developments. Behavioral and legal aspects of criminal acts. Classification and analysis of selected criminal offenses.

LENF 234 Criminal Procedure and Evidence. (3) Prerequisite, LENF 230. General principles and theories of criminal procedure. Due process. Arrest, search and seizure. Recent

developments. Study and evaluation of evidence and proof.

LENF 330 Contemporary Legal Policy Issues. (3) Prerequisite, LENF 230 and 234 or equivalent. In-depth examination of selected topics. Criminal responsibility. Socio-legal policy alternatives with regard to deviance. Law enforcement procedures for civil law and similar legal problems. Admissibility of evidence. Representation. Indigent's right to counsel.

LENF 340 Concepts of Law Enforcement Administration. (3) Prerequisite, LENF 100 or equivalent. An introduction to concepts of organization and management as these relate to law enforcement. Principles of structure, process, policy and procedure, communication and authority, division of work and organizational controls. Human element in the organization. Informal interaction and bureaucracy.

LENF 350 Law Enforcement-Community Relations. (3) Prerequisite, LENF 100 or equivalent. Examination of factors contributing to cooperation or friction between law enforcement personnel and the community, with emphasis on minority groups, political pressures and cultural problems. Community organization and social responsibility of law enforcement.

LENF 360 Industrial and Retail Security Administration. (3) Prerequisite, LENF 100, 220 or consent of instructor. The origins of contemporary private security systems. Organization and management of industrial and retail protective units.

LENF 388 Independent Reading In Law Enforcement. (3) H — Honors. Prerequisite, consent of instructor. Supervised study of selected topic in criminal justice. Repeatable to a maximum of six credits.

LENF 389 Independent Research in Law Enforcement. (3) H — Honors. Prerequisite, consent of instructor. Supervised study of selected topic in criminal justice. Repeatable to a maximum of six credits.

LENF 398 Law Enforcement Field Training. (1-6) Prerequisite, junior standing, majors only and consent of instructor. Supervised field training in law enforcement agencies as a structured and focused experience. The student, in consultation with his advisor, will select his particular area of interest and will be responsible to his advisor for continued contact and required report.

LENF 399 Directed Independent Research. (1-3) Prerequisite, senior standing, majors only and consent of instructor. Supervised individual research and study: library and field research, surveys, special local problems.

LENF 444 Advanced Law Enforcement and Administration. (3) Prerequisite, LENF 340 or consent of instructor. The structuring of manpower, material, and systems to accomplish the major goals of social control. Personnel and systems management. Political controls and limitations on authority and jurisdiction.

LENF 462 Special Problems in Security Administration. (3) Prerequisites, LENF 360 and consent of instructor. An advanced course for students desiring to focus on specific concerns in the study of private security organizations; business intelligence and espionage; vulnerability and criticality analyses in physical security; transportation, banking, hospital and military security problems; uniformed security forces; national defense information; and others.

LENF 498 Selected Topics in Criminal Justice. (1-6) Prerequisite, consent of instructor. Supervised study of a selected topic to be announced in the field of criminal justice. Repeatable to a maximum of six credits.

Linguistics

LING 100 Introduction to Linguistics. (3) Introduction to the basic concepts of modern descriptive linguistics. Phonology, morphology, syntax. Examinations of the methods of comparative linguistics, internal reconstruction and dialect geography.

LING 101 Language and Culture. (3) Prerequisite, sophomore standing. A non-technical introduction to linguistics, with special consideration of the relations between language and other aspects of culture. (Listed also as ANTH 271).

LING 401 Phonetics and Phonemics. (3) Training in the identification, description and symbolization of various sounds found in language. Study of scientific techniques for classifying sounds into units which are perceptually relevant for a given language.

LING 402 Morphology and Syntax. (3) A detailed study of language structure. No student may receive credit for both LING 402 and ENGL 484.

LING 403 Historical Linguistics. (3) Prerequisite, LING 401 and 402, or equivalent. A study of change in the phonological, grammatical and semantic structures of natural languages; language typology; reconstruction and various allied topics will be treated.

LING 498 Seminar in Linguistics. (3) Prerequisite, LING 100. Advanced topics in linguistics. Lectures and discussions by faculty, students and invited outside scholars. Repeatable to a maximum of six credits provided content is different.

Applied Mathematics

MAPL 460 Computational Methods. (3) Prerequisite, MATH 241 and CMSC 110, or equivalent. Basic computational methods for interpolation, least squares, approximation, numerical quadrature, numerical solution of polynomial and transcendental equations, systems of linear equations and initial value problems for ordinary differential equations. Emphasis on the methods and their computational properties rather than on their analytic aspects. (Listed also as CMSC 460.)

MAPL 470 Numerical Mathematics: Analysis. (3) Prerequisites, MATH 240 and 241; CMSC 110 or equivalent. This course with MAPL/CMSC 471, forms a one-year introduction to numerical analysis at the advanced undergraduate level. Interpolation, numerical differentiation and integration, solution of nonlinear equations, acceleration of convergence, numerical treatment of differential equations. Topics will be supplemented with programming assignments. (Listed also as CMSC 470.)

MAPL 471 Numerical Mathematics: Linear Algebra. (3) Prerequisites, MATH 240 and 241; CMSC 110 or equivalent. The course, with MAPL/CMSC 470, forms a one-year introduction to numerical analysis at the advanced undergraduate level. Direct solution to linear systems, norms, least squares problems, the symmetric eigenvalue problem, basic iterative methods. Topics will be supplemented with programming assignments. (Listed also as CMSC 471.)

MAPL 477 Optimization. (3) Prerequisite, CMSC 110, and MATH 405 or MATH 474. Linear programming including the simplex algorithm and dual linear programs, convex sets and elements of convex programming, combinatorial optimization integer programming. (Listed also as CMSC 477.)

MAPL 498 Selected Topics in Applied Mathematics. (1-3) Prerequisite, permission of the instructor. Topics in applied mathematics of special interest to advanced undergraduate students. May be repeated to a maximum of six credits if the subject matter is different.

Mathematics

MATH 001 Review of High School Algebra. (3) Recommended for students who fail the qualifying examination for MATH 105, 110, 115. Special fee. This course does not carry credit towards any degree at the University.

MATH 102 Introduction to Mathematics IA. (1) Prerequisite, consent of department. First third of a three-course sequence equivalent to MATH 110. Graphing, properties of straight lines, properties of quadratic functions, change of coordinates. Students may not receive credit for both MATH 102 and MATH 110, nor may they receive credit for MATH 102 if taken after the completion of any math course numbered above 110.

MATH 103 Introduction to Mathematics IB. (1) Prerequisite, MATH 102 and consent of department. Second third of a three-course sequence equivalent to MATH 110. Power functions, exponential functions, logarithmic functions and trigonometric functions. Students may not receive credit for both MATH 103 and MATH 110, nor may they receive credit for MATH 103 if taken after the completion of any math course numbered above 110.

MATH 104 Introduction to Mathematics IC. (1) Prerequisite, MATH 103 and consent of department. Final third of a three-course sequence equivalent to MATH 110. Inequalities, linear inequalities, graphing systems of linear inequalities, linear programming. Students may not receive credit for both MATH 104 and MATH 110, nor may they receive credit for MATH 104 if taken after the completion of any math course numbered above 110.

MATH 105 Mathematical Ideas. (3) Prerequisite, satisfactory performance on the SAT mathematics test, or MATH 001. This course is designed to provide an introduction to mathematical thinking, stressing ideas rather than techniques. Where possible connections are drawn with other disciplines.

MATH 110 Introduction to Mathematics. (3) Prerequisite, two and one half years of college preparatory mathematics and satisfactory performance on the SAT mathematics test, or MATH 001. Linear programming, systems of linear equations, matrices; elementary algebraic and transcendental functions, with emphasis on their properties and graphs. (Not open to students majoring in mathematics, engineering or the physical sciences. Credit will be given for only one course, MATH 110 or MATH 115.)

MATH 111 Introduction to Mathematics II. (3) Prerequisite, 3½ years of college preparatory

mathematics and satisfactory performance on the SAT mathematics test, or MATH 110; or MATH 115. Logic, Boolean, algebra, counting, probability, random variables, expectation application of the normal probability distribution. Credit will be given for only one of the courses, MATH 111 or STAT 100. (Not open to students majoring in mathematics, engineering or the physical sciences.)

MATH 115 Introductory Analysis. (3) Two lectures, two drill periods per week. Prerequisite, two and one half years of college preparatory mathematics and an appropriate score on the SAT mathematics test, or MATH 001. An introductory course for students not qualified to start MATH 140 or 220. Elementary functions and graphs; polynomials, rational function, exponential and logarithmic functions, trigonometric functions. Credit will be given for only one course: MATH 115 or MATH 110.

MATH 140 Analysis I. (4) Three lectures, two drill periods per week. Prerequisite, three and one half years of college preparatory mathematics or MATH 115. Sets and inequalities, Cartesian coordinates in the plane, the straight line, the circle, translation of coordinate axes, functions and their graphs, limits, continuity, the derivative and application of the derivative, anti-derivatives, definite integral. Credit will be given for only one course, MATH 140 or MATH 220.

MATH 141 Analysis II. (4) Three lectures, two drill periods per week. Prerequisite, MATH 140 or equivalent. Applications of integration, techniques of integration, polar coordinates, basic properties of the elementary functions, improper integrals, indeterminate forms, sequences, and infinite series. Credit will be given for only one course, MATH 141 or MATH 221.

MATH 142 Computer Lab for MATH 140. (1) Prerequisite, concurrent registration in MATH 140. Two hours laboratory per week. Application of computer methods to problems of the calculus. No previous computer experience is assumed.

MATH 143 Computer Lab for MATH 141. (1) Prerequisite, MATH 140, MATH 142 or its equivalent. Two hours laboratory per week. Application of computer methods to problems of the calculus.

MATH 150 Calculus I (Honors). (4) Prerequisite, approval of department. A rigorous treatment, with applications, of differential and integral calculus in one variable.

MATH 151 Calculus II (Honors). (4) Prerequisite, approval of department. A rigorous treatment, with applications, of differential and integral calculus in one variable.

MATH 210 Elements of Mathematics. (4) Prerequisite, one year of college preparatory algebra. Required for majors in elementary education, and open only to students in this field. Topics from algebra and number theory, designed to provide insight into arithmetic: inductive proof, the natural number system based on the Peano axioms; mathematical systems, groups, fields; the system of integers; the system of rational numbers; congruence, divisibility; systems of numeration.

MATH 211 Elements of Geometry. (4) Prerequisite, MATH 210 or equivalent. Structure of mathematics systems, algebra of sets, geometrical structures, logic, measurement, congruence, similarity, graphs in the plane, geometry on the sphere.

MATH 220 Elementary Calculus. (3) Prerequisite, three and one half years of college preparatory mathematics including trig, and satisfactory performance on the SAT mathematics test, or MATH 110, or MATH 115. Basic ideas of differential and integral calculus, with emphasis on elementary techniques of differentiation and applications. Not open to students majoring in mathematics, engineering or the physical sciences. Credit will be given for only one course, MATH 140 or MATH 220.

MATH 221 Elementary Calculus. (3) Prerequisite, MATH 220, or MATH 140, or equivalent. Differential and integral calculus, with emphasis on elementary techniques of integration and applications. Not open to students majoring in mathematics, engineering of the physical sciences. Credit will be given for only one course, MATH 141 or MATH 221.

MATH 240 Linear Algebra. (4) Three lectures, two drill periods per week. Prerequisite, MATH 141 or equivalent. Basic concepts of linear algebra: vector spaces, applications to line and plane geometry, linear equations and matrices, similar matrices, linear transformations, eigenvalues, determinants and quadratic forms. Credit will be given for only one course, MATH 240 and MATH 400.

MATH 241 Analysis III. (4) Intended to bridge the gap between calculus and advanced calculus. Introduces the student to the logical foundations of mathematics and to the technique of proving theorems. The topics will be drawn from: logic, set theory, structure of the real line, elementary topology, convertence, functions, infinite sets, continuity.

MATH 246 Differential Equations for Scientists and Engineers. (3) Prerequisite, MATH 141 or equivalent. An introduction to the basic methods of solving differential equations. Separable, exact, and especially linear differential equations will be treated. The main techniques included will be undertermined coefficients, series solutions, LaPlace transforms, and numerical methods.

MATH 250 Calculus III (Honors). (4) Prerequisite, approval of department. Elements of linear algebra, Euclidean and other metric spaces; multi-variable calculus; implicit function theorem; theorems of Green, Gauss and Stokes. Riemann Stieltjes integral and, as time permits, ordinary differential equations, Fourier series, orthogonal functions.

MATH 251 Calculus IV (Honors). (4) Prerequisite, approval of department. Elements of linear algebra, Euclidean and other metric spaces; multi-variable calculus; implicit function theorem; theorems of Green, Gauss and Stokes. Riemann Stieltjes integral and, as time permits, ordinary differential equations, Fourier series, orthogonal functions.

MATH 310 Introduction to Mathematical Reasoning. (3) Prerequisite, MATH 141. Recommended pre- or co-requisite:

MATH 398 Honors Seminar. (2) Prerequisite, permission of the departmental honors committee. Reports by students on mathematical literature; solution of various problems.

MATH 400 Vectors and Matrices. (3) Prerequisite, MATH 141 or 221. Algebra of vector spaces and matrices. Recommended for students interested in the applications of mathematics. (Not open to students who have had MATH 240 or 405.)

MATH 401 Applications of Linear Algebra. (3) Prerequisite, MATH 400, or MATH 240, or consent of instructor. Various applications of linear algebra: theory of finite games, linear programming, matrix methods as applied to finite Markov chains, random walk, incidence matrices, graphs and directed graphs, networks, transportation problems.

MATH 402 Algebraic Structures. (3) Prerequisite, MATH 240 or equivalent. For students having only limited experience with rigorous mathematical proofs. Parallels MATH 403. Groups, rings, integral domains and fields, detailed study of several groups; properties of integers and polynomials. Emphasis on the origin of the mathematical ideas studied and the logical structure of the subject. Credit will be given for only one of the courses, MATH 402 or MATH 403.

MATH 403 Introduction to Abstract Algebra. (3) Prerequisite, MATH 241 or equivalent. Integers: groups, rings, integral domains, fields. Credit will be given for only one of the courses, MATH 402 or MATH 403.

MATH 404 Field Theory. (3) Prerequisite, MATH 403. Algebraic and transcendental elements, Galois theory, constructions with straight-edge and compass, solutions of equations of low degrees, insolubility of the quintic, Sylow theorems, fundamental theorem of finite Abelian groups.

MATH 405 Introduction to Linear Algebra. (3) Prerequisite, MATH 403 or consent of instructor. An abstract treatment of finite dimensional vector spaces. Linear transformations and their invariants. Credit will be given for only one of the courses, MATH 400 or MATH 405.

MATH 406 Introduction to Number Theory. (3) Prerequisite, one year of college mathematics. Rational integers, divisibility, prime numbers, modules and linear forms, unique factorization theorem, Euler's function, Mobius' function, cyclotomic polynomial, congruences and quadratic residues, LeGendre's and Jacobi's symbol, reciprocity law of quadratic residues, introductory explanation of the method of algebraic number theory.

MATH 410 Advanced Calculus. (3) Prerequisite, MATH 241. First semester of a year course. Subjects covered during the year are: sequences and series of numbers, continuity and differentiability of real valued functions of one variable, the Riemann integral, sequences of functions, and power series. Functions of several variables including partial derivatives, multiple integrals, line and surface integrals. The implicit function theorem.

MATH 411 Advanced Calculus. (3) Prerequisite, MATH 410, and MATH 240 or MATH 400. Continuation of MATH 410.

MATH 413 Introduction to Complex Variables. (3) Prerequisite, MATH 410. The algebra of complex numbers, analytic functions mapping properties of the elementary functions. Cauchy's theorem and the Cauchy integral formula. Residues. (Credit will be given for only one of the courses MATH 413 and 463.)

MATH 414 Differential Equations. (3) Prerequisite, MATH 240 and MATH 410, or equivalent. Existence and uniqueness theorems for initial value problems. Linear

theory: fundamental matrix solutions, variation of constants formula, Floquet theory for periodic linear systems. Asymptotic orbital and Lyapunov stability with phase plane diagrams. Boundary value theory and series solutions are optional topics.

MATH 415 Introduction to Partial Differential Equations. (3) Prerequisite, MATH 410. Topics will include one dimensional wave equation; linear second order equations in two variables, separations of variables and Fourier series; Sturm-Liouville theory. (Credit will be given for only one course, MATH 415 or MATH 462.)

MATH 416 Introduction to Real Variables. (3) Prerequisite, MATH 410. The Lebesgue integral. Fubini's theorem. The LP spaces. Convergence theorems.

MATH 417 Introduction to Fourier Analysis. (3) Prerequisite, MATH 410. Fourier series. Fourier and LaPlace transforms.

MATH 430 Geometric Transformations. (3) Prerequisite, MATH 240. Recommended for students in mathematics education. Important groups of geometric transformations, including the isometries and similarities of the plane. Geometries related to transformation groups.

MATH 431 Foundations of Geometry. (3) Prerequisite, one year of college mathematics. Recommended for students in mathematics education. The axiomatic foundations of geometry. Attention will be given to one or more axiomatic developments of Euclidean geometry and to the relation of Euclidean geometry to other geometric systems.

MATH 432 Introduction to Point Set Topology. (3) Prerequisite, MATH 410 or 450, or equivalent. Connectedness, compactness, transformations, homomorphisms; application of these concepts to various spaces, with particular attention to the Euclidean plane.

MATH 433 Introduction to Algebraic Topology. (3) Prerequisite, MATH 403 and 432, or equivalent. Chains, cycles, homology groups for surfaces, the fundamental group.

MATH 436 Introduction to Differential Geometry. (3) Prerequisite, MATH 241 or equivalent. The differential geometry of curves and surfaces, curvature and torsion, moving frames, the fundamental differential forms, instrinsic geometry of a surface.

MATH 444 Elementary Logic and Algorithms. (3) Prerequisite, MATH 240 or consent of instructor. An elementary development of propositional logic, predicate logic, set algebra, and Boolean algebra, with a discussion of Markov algorithms, turing machines and recursive functions. Topics include post productions, word problems, and formal languages. (Also listed as CMSC 450.)

MATH 446 Axiomatic Set Theory. (3) Prerequisite, MATH 403 or 450 or consent of instructor. Development of a system of axiomatic set theory, choice principles, induction principles, ordinal arithmetic including discussion of cancellation laws, divisibility, canonical expansions, cardinal arithmetic including connections with the axiom of choice, Hartog's theorem, Konig's theorem, properties of regular, singular, and inaccessible cardinals.

MATH 447 Introduction to Mathematical Logic. (3) Prerequisite, MATH 403 or 410 or 450. Formal propositional logic, completeness, independence, decidability of the system, formal quantificational logic, first-order axiomatic theories, extended Godel completeness theorem, Lowenheim-Skolem theorem, model-theoretical applications.

MATH 450 Fundamental Concepts of Mathematics. (3) Prerequisite, MATH 240 or consent of instructor. Sets, relations, mappings. Construction of the real number system starting with Peano postulates; algebraic structures associated with the construction; Archimedean order, sequential completeness and equivalent properties of ordered fields. Finite and infinite sets, denumberable and non-denumberable sets.

MATH 460 Computational Methods. (3) Prerequisite, MATH 241 and CMSC 110, or equivalent. Study of the basic computational methods for interpolation, least squares, approximation, numerical quadrature, numerical solution of polynomial and transcendental equations, systems of linear equations and initial value problems for ordinary differential equations. The emphasis is placed on a discussion of the methods and their computational properties rather than on their analytic aspects. Intended primarily for students in the physical and engineering sciences. (Credit will be given for only one course, MATH/CMSC 470 or MATH/CMSC 460.) (Listed also as CMSC 460.)

MATH 462 Linear Analysis for Scientists and Engineers. (3) Prerequisites, MATH 241 and some knowledge of differential equations. Linear spaces and operators, orthogonality, Sturm-Liouville problems and eigenfunction expansions for ordinary differential equations, introduction to partial differential equations, boundary and intial value problems. (Credit will be given for only one course, MATH 462 or MATH 415.)

MATH 463 Complex Variables for Scientists and Engineers. (3) Prerequisite, MATH 241 or equivalent. The algebra of complex numbers, analytic functions, mapping properties of the elementary functions. Cauchy integral formula. Theory of residues and application to evaluation of integrals. Conformal mapping. (Credit will be given for only one of the courses, MATH 413 or MATH 463.)

MATH 464 Transform Methods for Scientists and Engineers. (3) Prerequisites, MATH 264, and either MATH 463 or MATH 413. Fourier series, Fourier and La Place transforms. Evaluation of the complex inversion integral by the theory of residues. Applications to ordinary and partial differential equations of mathematical physics: solutions using transforms and separation of variables. Additional topics such as Bessel functions and calculus of variations may be included.

MATH 470 Introduction to Numerical Analysis. (3) Prerequisite, MATH 241. Introduction to the analysis of numerical methods for solving linear systems of equations, nonlinear equations in one variable, interpolation and approximation problems and the solution of initial value problems for ordinary differential equations. Stress is placed on providing the student with a good understanding of the theoretical foundations of the various methods. Intended primarily for students in mathematics, applied mathematics, and computer science. This course should not be taken by students who have passed MATH/CMSC 460. (Listed also as CMSC 470.)

MATH 472 Differential Equations and Numerical Methods. (3) Prerequisites, MATH 240, MATH 410, and CMSC 110 or their equivalents. A general introduction to the theory of ordinary differential equations emphasizing numerical methods for constructing approximate solutions. Existence and uniqueness theorems, Runge-Kutta method, systems of linear differential equations, phase plane methods, and numerical solution of boundary value problems.

MATH 474 Applied Linear Algebra. (3) Prerequisites, MATH 240, MATH 241, and CMSC 110 or their equivalents. A treatment of finite dimensional linear spaces and linear transformations with an emphasis on applications and computational aspects.

MATH 475 Combinatorics and Graph Theory. (3) Prerequisite, MATH 240 or equivalent. General enumeration methods, difference equations, generating functions. Elements of graph theory to transport networks, matching theory and graphical algorithms. (Listed also as CMSC 475.)

MATH 477 Optimization. (3) Prerequisite, CMSC 110 and MATH 405 or MATH 474. Linear programming including the simplex algorithm and dual linear programs, convex sets and elements of convex programming, combinatorial optimization, integer programming. (Listed also as STAT 477 and CMSC 477.)

MATH 478 Selected Topics for Teachers of Mathematics. (1-3) Prerequisite, one year of college mathematics or consent of instructor.

MATH 481 Introduction to Number Theory. (3) Prerequisite, one year of college mathematics or consent of instructor. Elementary number theory and the development of the real numbers for teachers. (Not open to students majoring in mathematics or physical sciences.)

MATH 482 Introduction to Algebra. (3) Prerequisite, one year of college mathematics or consent of instructor. Modern ideas in algebra and the theory of equations for teachers. (Not open to students majoring in mathematics or physical sciences.)

MATH 483 Introduction to Geometry. (3) Prerequisite, one year of college mathematics or consent of instructor. A study of basic ideas from Euclidean and non-Euclidean geometry for teachers. (Not open to students majoring in mathematics or physical sciences.)

MATH 484 Introduction to Analysis. (3) Prerequisite, one year of college mathematics or consent of instructor. A study of the limit concept and the calculus for teachers. Previous knowledge of calculus is not required. (Not open to students majoring in mathematics or physical sciences.)

MATH 488 National Science Foundation Summer Institute for Teachers of Science and Mathematics — Seminar. (1-3) Lectures and discussion to deepen the student's appreciation of mathematics as logical discipline and as a medium of expression. Special emphasis on topics relevant to current mathematical curriculum studies and revisions.

MATH 490 History of Mathematics. (3) Prerequisite, MATH 240 and 241, or equivalent. The development of mathematics from around 1900 B.C. to around 1900 A.D. with special emphasis on the period of the Greeks (600 B.C.-200 A.D.) , the period of development of the calculus (17th century), and the period of the institution of the 'modern' style of rigor (19th century). Influence of the cultural environment on the development of mathematics at various

times, the development of the mathematical concept of infinity and the limit process, the interplay between algebra and analysis, and the development of the modern concept of the mathematical proof.

MATH 498 Selected Topics in Mathematics. (1-16) Prerequisite, permission of the instructor. Topics of special interest to advanced undergraduate students will be offered occasionally under the general guidance of the departmental committee on undergraduate studies. Honors students register for reading courses under this number.

Meteorology

METO 301 The Atmospheric Environment. (3) Prerequisites, CHEM 103, 104, PHYS 121, 122, or equivalent. This course will give a broad survey of the state of knowledge and problems of atmospheric science. It covers a wide range of topics, including origin, structure, and chemistry of the atmosphere; energy transformations, motions, and resulting weather; atmospheric optics and electricity; the water cycle; pollution and weather modification; atmospheric factors in ecology.

METO 398 Topics in Atmospheric Science. (3) Intended primarily for non-science majors. Study of some aspects of atmosphere sciences as applied to the environment. Repeatable to a maximum of six credits provided the subject matter is different.

METO 410 Descriptive and Synoptic Meteorology I. (3) Prerequisites, MATH 241, PHYS 294 or PHYS 263 or equivalent. METO 441 is suggested as a companion course. With METO 411, an introduction to broad range of theoretical and applied studies in meteorology in order to acquaint him with the interaction of the physical and dynamic processes and the various scales of atmospheric phenomena. Introduction to radiational energy transfer in the atmosphere, earth-atmospheric energy budgets, atmospheric thermodynamics, statics and mechanics and a survey of the general distribution of temperature, pressure, moisture and wind in the atmosphere.

METO 411 Descriptive and Synoptic Meteorology II. (3) Prerequisite, METO 410. METO 442 suggested as a companion course. A continuation of METO 410 including an introduction to the concepts of vorticity and circulation in the atmosphere, properties of cold fronts and warm fronts, cyclones and anticyclones, air masses, thunderstorms, elements of dynamic weather forecasting, microphysics of cloud formation and precipitation, turbulence and diffusion in the atmosphere.

METO 412 Physics and Thermodynamics of the Atmosphere. (3) Prerequisites, MATH 241, PHYS 284 or equivalent. Optical phenomena, the radiation balance, introduction to cloud physics, atmospheric electrical phenomena, basic thermodynamic processes and their application to the atmosphere.

METO 413 Atmospheric Processes on Molecular and Atomic Scale. (3) Prerequisite, senior or graduate standing in the physical or engineering sciences, at least one year of college physics, a familiarity with differential and integral calculus. An introduction to atmospheric processes with an emphasis on atomic and molecular effects. Theories of the gas phase interactions of neutral atoms and molecules and charged particles applied to meteorological and atmospheric topics.

METO 416 Introduction to Atmospheric Dynamics. (3) Prerequisites, MATH 241, 246, PHYS 263. The equations of atmospheric motion, coordinate systems; balanced flows and elementary application; divergence; circulation and vorticity; the planetary boundary layer; diagnostic analysis with the quasi-geotrophic equations.

METO 420 Physical and Dynamical Oceanography. (3) Prerequisite, METO 410 or a basic course in fluid dynamics such as ENME 340. Historical review of oceanography; physical, chemical, stratification and circulation properties of the ocean; dynamics of frictionless, frictional, wind driven and thermohaline circulation; air-sea interactions.

METO 422 Oceanic Waves, Tides and Turbulence. (3) Prerequisite, METO 420. Introduction to the theory of oceanic wave motions; tides, wind waves, swells, storm surges, seiches, isunamis, internal waves, turbulence, stirring, mixing and diffusion; probability, statistics and time series.

METO 434 Air Pollution. (3) Prerequisite, senior standing in science or engineering or consent of the instructor. Three lectures per week. Classification of atmospheric pollutants and their effects on visibility, inanimate and animate receptors. Evaluation of source emissions and principles of air pollution control; meteorological factors governing the distribution and removal of air pollutants; air quality measurements and air pollution control legislation.

METO 441 Weather Map Discussion and Practice Forecasting I. (1) Prerequisite, METO 301 or equivalent. Corequisite, METO 410. Discussion of current weather situation on the basis of information received by facsimile from national meteorological center. Use of computer-produced prognostic information, critique of previous forecast, and briefing on expected weather conditions by experienced forecasters. Preparation of practice forecasts, using all available information. Readings in synoptic meteorology.

METO 442 Weather Map Discussion and Practice Forecasting. (1) Prerequisite, METO 441. A continuation of METO 441.

METO 499 Special Problems in Atmospheric Science. (1-3) Prerequisite, consent of instructor. Research or special study in the field of meteorology and the atmospheric and oceanic sciences. Repeatable to a maximum of 6 credits.

Microbiology

MICB 200 General Microbiology. (4) Two lectures and two two-hour laboratory periods a week. Prerequisite, two semesters of chemistry. The biology of microorganisms, with special reference to the bacteria. Fundamental principles of microbiology as revealed through an examination of the structure, physiology, genetics, and ecology of microorganisms.

MICB 290 Applied Microbiology. (4) Two lectures and two two-hour laboratory periods a week. Prerequisite, MICB 200. The application of microorganisms and microbiological principles to milk, dairy products, and foods, industrial processes; soil; water and sanitation operations.

MICB 300 Microbiological Literature. (1) One lecture period a week. Prerequisite, a major in microbiology. Introduction to periodical literature, methods, interpretation, and presentation of reports.

MICB 322 Microbiology and the Public. (3) Three lectures per week. A course for general (non-science) students in which they will be made aware of the ways in which epidemic disease, water pollution, immunization requirements, solid waste disposal, and the like, impinge on current social and political problems in the American community.

MICB 330 Microbial Ecology. (2) Prerequisites, MICB 200 and CHEM 201-202. Two lectures a week. Interaction of microorganisms with other microorganisms, higher organisms and the environment. Role of microorganisms in the ecosphere. Microorganisms and current environmental problems.

MICB 380 Bacterial Genetics. (4) Prerequisites, CHEM 201-202 and 8 credits in microbiology. Two lectures and two-hour laboratory periods a week. Organization, replication, expression, mutation and transfer of the genetic material of bacteria and bacteriophages. Techniques of study.

MICB 388 Special Topics in Microbiology. (1-4) Prerequisite, 8 credits in microbiology, or consent of instructor. Presentation and discussion of special subjects in the field of microbiology. A maximum of 8 credit hours of MICB 388 may be applied to a major in microbiology.

MICB 399 Microbiological Problems. (3) Prerequisite, 16 credits in microbiology. Registration only upon the consent of the instructor. This course is arranged to provide qualified majors in microbiology and majors in applied fields an opportunity to pursue specific microbiological problems under the supervision of a member of the department.

MICB 400 Systematic Microbiology. (2) Two lecture periods a week. Prerequisite, 8 credits in microbiology or consent of instructor. History and philosophy of classification. Alpha, numerical and molecular genetic taxonomy. Methods used in microbial identification and classification.

MICB 410 History of Microbiology. (1) One lecture period a week. Prerequisite, a major or minor in microbiology or consent of instructor. History and integration of the fundamental discoveries of the science. The modern aspects of cytology, taxonomy, fermentation, and immunity in relation to early theories.

MICB 420 Epidemiology and Public Health. (2) Two lecture periods a week. Prerequisite, MICB 200. History, characteristic features, and epidemiology of the important responsibilities; vital statistics.

MICB 430 Marine Microbiology. (2) Two lectures per week. Morphology, biochemistry and ecology of marine microorganisms including fungi, yeasts, bacteria and viruses. Properties of marine bacteria, such as luminescence, metal ion requirements for growth, production of ectocrine compounds, and sampling and culturing marine microorganisms, are covered.

MICB 431 Marine Microbiology Laboratory. (2) Two two-hour labs per week. Morphology, biochemistry and ecology of marine microorganisms. Properties of marine bacteria; luminescence, metal ion requirements, endocrine compound production, sampling and culturing, are covered. Laboratory includes sampling trips on the Chesapeake Bay and a deep sea research cruise.

MICB 440 Pathogenic Microbiology. (4) Two lectures and two two-hour laboratory periods

a week. Prerequisite, MICB 200. The role of bacteria and fungi in the diseases of man with emphasis upon the differentiation and culture of microorganisms, types of disease, modes of disease transmission, prophylactic, therapeutic, and epidemiological aspects.

MICB 450 Immunology. (4) Two lectures, and two two-hour laboratory periods a week. Prerequisite, MICB 440. Principles of immunity; hypersensitiveness. Fundamental techniques of immunology.

MICB 460 General Virology. (3) Prerequisite, MICB 440 or equivalent. Discussion of the physical and chemical nature of viruses, virus cultivation and assay methods, virus replication, viral diseases with emphasis on the oncogenic viruses, viral genetics, and characteristics of the major virus groups.

MICB 470 Microbial Physiology. (4) Two lectures and two two-hour laboratory periods a week. Prerequisites, 8 credits in microbiology and CHEM 461, 462, or equivalent. Aspects of the growth, death, and energy transactions of microorganisms are considered, as well as the effects of the physical and chemical environment on them.

MICB 490 Microbial Fermentations. (2) Second semester. Two lecture periods a week. Prerequisite, MICB 470. Principles and practice in industrial fermentation processes, and the study of fermentative metabolism in microorganisms.

MICB 491 Microbial Fermentations Laboratory. (2) Second semester. Two two-hour laboratory periods a week. Prerequisite, MICB 490, or concurrent registration in MICB 490, and consent of instructor. Methods for the conduct, control and analysis of fermentation processes.

Music Education

MUED 197 Pre-Professional Experiences. (1) An orientation into the role of the music teacher in the school and community. Class meets one hour a week for planning and discussion. Students spend one afternoon a week assigned to various music education activities. Limited to music education majors.

MUED 352 Music for the Elementary Classroom Teacher. (2-3) Prerequisite, MUSC 155 or consent of instructor. For non-music majors. Methods for guiding elementary school students in musical experiences; development of objectives, and a survey of instructional materials.

MUED 420 Materials, Techniques and Organization for the Instrumental Music Program. (2) Prerequisites, MUSC 113, 114, 115, 116, 117, 120, 121, 491 and MUED 470; or consent of instructor. A study of instructional materials, performing repertoire, rehearsal techniques, and program planning for the school instrumental program. Organization, scheduling, budgeting and purchasing are included.

MUED 438 Special Problems in the Teaching of Instrumental Music. (2-3) Prerequisite, MUSC 113-213 or the equivalent. A study, through practice on minor instruments, of the problems encountered in public school teaching of orchestral instruments. Literature and teaching materials, minor repairs, and adjustment of instruments are included. The course may be taken for credit three times since one of four groups of instruments: strings, woodwind, brass or percussion will be studied each time the course is offered.

MUED 450 Music in Early Childhood Education. (3) Prerequisite, MUSC 155 or equivalent. Creative experiences in songs and rhythms, correlation of music and everyday teaching with the abilities and development of each level; study of songs and materials; observation and teaching experience with each age level.

MUED 460 Creative Activities in the Elementary School. (2-3) Prerequisite, music methods or teaching experience. A study of the creative approach to the development of music experiences for children in the elementary grades emphasizing contemporary music and contemporary music techniques.

MUED 470 General Methods for Teaching Music. (4) Prerequisite, MUED 197 and EDHD 300; or consent of instructor. Music in the education of youth, ages six to eighteen. Basic planning and implementation of music instruction, vocal and instrumental, for the general and specialized programs of music instruction in the schools; use of current methods, materials, and teaching techniques. Six class hours per week including field experiences in designated elementary and secondary schools.

MUED 472 Choral Techniques and Repertoire. (2) Prerequisites, MUED 470 and MUSC 490. Rehearsal techniques for developing appropriate diction, tone, production, intonation, phrasing, and interpretation of choral music; examination of a wide variety of repertoire for use by choral performing groups on the elementary and secondary levels.

MUED 478 Special Topics in Music Education. (1-2) Prerequisite, MUED 470 or consent of department. Each topic focuses on a specific aspect of the music instructional program; collectively, the topics cover a wide range of subject matter relevant to today's schools. May be repeated to a maximum of six credits.

MUED 480 The Vocal Music Teacher and School Organization. (2) Prerequisite, student teaching, previous or concurrent. The role of the vocal music specialist in the implementation of the supervision and administration of the music programs in the elementary and secondary schools. Open to graduate students by permission of instructor.

MUED 499 Workshops,Clinics,Institutes. (2-6) Innovative and experimental dimensions of music education will be offered to meet the needs of music teachers and music supervisors and to allow students to individualize their programs. The maximum number credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached.

Music

MUSC 100 Class Voice. (2) Four hours per week. A laboratory course in which a variety of voices and vocal problems are represented. Principles of correct breathing as applied to singing; fundamentals of tone production and diction. Students are taught to develop their own voices. Repertoire of folk songs and songs of the classical and romantic periods.

MUSC 102 Class Piano. (2) Four hours per week. Functional piano training for beginners. Development of techniques useful for school and community playing. Basic piano techniques; chord, arpeggio, and scale techniques; melody and song playing; simple accompaniments, improvisation for accompaniments and rhythms; sight reading and transposition, and playing by ear.

MUSC 103 Class Piano. (2) Four hours per week. Functional piano training for beginners. Development of techniques useful for school and community playing. Basic piano techniques; chord, arpeggio, and scale techniques; melody and song playing; simple accompaniments, improvisation for accompaniments and rhythms, sight reading and transposition, and playing by ear. MUSC 103 is a continuation of MUSC 102; elementary repertoire is begun.

MUSC 104 Class Guitar. (2) Three hours per week. Open to music and non-music majors. Folk guitar playing for beginners. Hand position, tuning, left and right hand techniques, use of capo; musical concepts as related to guitar technique. Emphasis on performance of traditional and contemporary folk music literature.

MUSC 110 Class Study of String Instruments. (2) Open only to majors in music education (vocal option). Four laboratory hours per week. Basic principles of string playing, and a survey of all string instruments.

MUSC 111 Class Study of Wind and Percussion Instruments. (2) Open only to majors in music education (vocal option). Four laboratory hours per week. A survey of wind and percussion instruments with emphasis on ensemble training. The student will acquire an adequate playing technique on one instrument and gain an understanding of the acoustical and construction principles of the others.

MUSC 113 Class Study — Violin. (2) Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the violin with emphasis on ensemble training. The student will acquire an adequate playing technique.

MUSC 114 Class Study — Cello and Bass. (2) Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the instruments with emphasis on ensemble training. The student will acquire an adequate playing technique.

MUSC 116 Class Study — Clarinet. (2) Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the clarinet with emphasis on ensemble training. The student will acquire an adequate playing technique.

MUSC 117 Class Study — Flute, Oboe, Bassoon, and Saxophone. (2) Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the instruments with emphasis on ensemble training. The student will acquire an adequate playing technique on two to four instruments, and an understanding of the acoustical and construction principles of the others.

MUSC 120 Class Study — Cornet. (2) Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the cornet with emphasis on ensemble training. The student will acquire an adequate playing technique.

MUSC 121 Class Study — Horn, Trombone, Euphonium, and Tuba. (2) Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the instruments with emphasis on ensemble training. The student will acquire an adequate

playing technique on two to four instruments, and an understanding of the acoustical and construction principles of the others.

MUSC 122 Class Study — Percussion. (2) Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the instruments with emphasis on ensemble training. The student will acquire an adequate playing technique on two to four instruments, and an understanding of the acoustical and construction principles of the others.

MUSC 124 Diction; Italian and German. (1) Two hours per week. Open to music and non-music majors, but structured as an augmentation of private voice study. A study of phonetics and diction for singers in the presentation of solo literature in Italian and German.

MUSC 125 Diction; French and English. (1) Two hours per week. Open to music and non-music majors, but structured as an augmentation of private voice study. A study of phonetics and diction for singers in the presentation of solo literature in French and English.

MUSC 128 Sight Reading for Pianists. (2) A course to give the piano major an opportunity to develop proficiency in sight reading at the keyboard. Repeatable to a maximum of 4 credits.

MUSC 129 Ensemble. (1)
A — Men's Glee Club
B — Women's Chorus
C — Chapel Choir
D — Chamber Chorus
E — Madrigal Singers
F — Opera Workshop
G — University Orchestra
H — Theater Orchestra
I — Band
J — Brass Choir
K — Percussion
L — Clarinet Choir
M —Saxophone
N — String
O — Woodwind Quintet
P — Keyboard
Q — Chamber Orchestra
R — Instrumental Consort
S — Twentieth Century
T — Jazz
U — Guitar
Z — University Chorus

Three laboratory hours per week. Rehearsal and performance of selected works for small ensembles of instruments, piano, or small vocal groups. After two registrations in MUSC 129 the student will elect MUSC 229 for two additional semesters, and MUSC 329 thereafter. In addition to indicating the course number (129, 229, 329) the student will indicate a suffix.

MUSC 130 Survey of Music Literature. (3) Three lectures and one laboratory hour per week. Open to all students except music and music education majors. MUSC 130 and 131 may not both be taken for credit. A study of the principles upon which music is based, and an introduction to the musical repertoires performed in America today.

MUSC 131 Introduction to Music. (3) Open only to music or music education majors; other students take MUSC 130. MUSC 130 and 131 may not both be counted for credit. A study of the forms and styles of music, leading to an intelligent appreciation of the art and providing a foundation for more advanced courses in the department of music.

MUSC 132 Introduction to World Music I. (3) Introductory course designed as an alternative to MUSC 130. Covers the musical cultures of Asia: Japan, China, Indonesia, India, Persia, Turkey, etc.

MUSC 133 Introduction to World Music II. (3) Introductory course designed as an alternative to MUSC 130. Covers the musical cultures of the Balkans, Africa, Spain, South and North America.

MUSC 135 Basic Notational Skills. (2) Three hours per week. An introductory course in fundamentals of music notation and the development of aural skills. May not be used in fulfillment of degree requirements by majors in music.

MUSC 150 Theory of Music. (3) Two lectures and three laboratory hours per week. A fundamental course in the elements of music. Study of rhythms, scales, chord structures, and tonalities through ear training, sight singing, and keyboard drill.

MUSC 151 Theory of Music. (3) Two lectures and three laboratory hours per week. A fundamental course in the elements of music. Study of rhythms, scales, chord structures, and tonalities through ear training, sight singing, and keyboard drill. The student must achieve a grade of C in MUSC 151 in order to register for MUSC 250.

MUSC 155 Fundamentals for the Classroom Teacher. (3) Open to students majoring in elementary education or childhood education; other students take MUSC 150. MUSC 150 and 155 may not both be counted for credit. The fundamentals of music theory and practice, related to the needs of the classroom and kindergarten teacher, and organized in accord with the six-area concept of musical learning.

MUSC 200 Advanced Class Voice. (2) Four hours per week. Prerequisite, MUSC 101 or equivalent vocal training. Continuation of MUSC 101, with more advanced repertoire for solo voice and small ensembles. A special section for music-education majors will include the study of methods and materials for teaching class voice.

MUSC 201 Advanced Class Voice. (2) Four hours per week. Prerequisite, MUSC 101 or equivalent vocal training. Continuation of MUSC 101, with more advanced repertoire for solo voice and small ensembles. A special section for music-education majors will include the study of methods and materials for teaching class voice.

MUSC 202 Advanced Class Piano. (2) Four hours per week. Prerequisite, MUSC 103 or equivalent piano training. Advanced keyboard techniques. Continuation of skills introduced in MUSC 103. Transposition, modulation, and sight reading; methods of teaching functional piano.

MUSC 203 Advanced Class Piano. (2) Four hours per week. Prerequisite, MUSC 202 or equivalent piano training. Advanced keyboard techniques. Continuation of skills introduced in MUSC 202. Transposition, modulation, and sight reading; methods of teaching functional piano. Development of style in playing accompaniments and in playing for community singing. More advanced repertoire.

MUSC 204 Advanced Class Guitar. (2) Prerequisite, MUSC 104 or the equivalent. Three hours per week. Open to music and non-music majors. Advanced techniques for playing folk guitar. Continuation of skills introduced in MUSC 104 and bass runs, 'hammering-on barre chords. Emphasis on stylistic performance of traditional and contemporary folk music.

MUSC 205 Vocal Performance Techniques. (2) Three hours per week. Open to music and non-music majors. Study of techniques of solo singing and stage presence.

MUSC 213 Advanced Class Strings. (2) Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the instruments with emphasis on ensemble training.

MUSC 228 Accompanying for Pianist. (2) Prerequisite, MUSC 128. A course to give the piano major experience in dealing with the problems of accompanying at an intermediate stage of difficulty. Guidance and instruction in class will be supplemented by extensive experience working as an accompanist in applied studios. Repeatable to a maximum of 4 credits.

MUSC 229 Ensemble (1)
A — Men's Glee Club
B — Women's Chorus
C — Chapel Choir
D — Chamber Chorus
E — Madrigal Singers
F — Opera Workshop
G — University Orchestra
H — Theater Orchestra
I — Band
J — Brass Choir
K — Percussion
L — Clarinet Choir
M — Saxophone
N — String
O — Woodwind Quintet
P — Keyboard
Q — Chamber Orchestra
R — Instrumental Consort
S — Twentieth Century
T — Jazz
U — Guitar
Z — University Chorus

Three laboratory hours per week. Rehearsal and performance of selected works for small ensembles of instruments, piano, or small vocal groups. After two registrations in MUSC 129 the student will elect MUSC 229 for two additional semesters, and MUSC 329 thereafter. In addition to indicating the course number (129, 229, 329) the student will indicate a suffix.

MUSC 248 Special Problems in Music. (2-3) Prerequisite, permission of instructor. Designed to allow a student of theory or music history to pursue a specialized topic or project under the supervision of a faculty member. Repeatable to a maximum of six credits.

MUSC 250 Advanced Theory of Music. (4) Prerequisite, MUSC 151 with a grade of at least C. Three lectures and two laboratory hours per week. An integrated course of written harmony, keyboard harmony, and ear training. Continuation of the principles studied in MUSC 151. Harmonic progressions; MUSC 250, eighteeenth-century chorale style. Realization of figured basses, and composition in the smaller forms. Advanced study of solfege, with drill in melodic, rhythmic, and harmonic dictation.

MUSC 251 Advanced Theory of Music. (4) Prerequisite, MUSC 151 with a grade of at least C. Three lectures and two laboratory hours per week. An integrated course of written harmony, keyboard harmony, and ear training. Continuation of the principles studied in MUSC 151. Harmonic progressions;

nineteenth-century styles including chromatic and modulatory techniques. Realization of figured basses, and composition in the smaller forms. Advanced study of solfege, with drill in melodic, rhythmic, and harmonic dictation.

MUSC 328 Chamber Music Performance for Pianists. (2) A course to give the piano major experience in dealing with the problems of playing chamber music at a moderately difficult level. Class instruction will center around actual rehearsal and performance situations and will be supplemented by further experience working in chamber ensemble in applied studios. Repeatable to a maximum of 4 credits.

MUSC 329 Ensemble (1)
A — Men's Glee Club
B — Women's Chorus
C — Chapel Choir
D — Chamber Chorus
E — Madrigal Singers
F — Opera Workshop
G — University Orchestra
H — Theater Orchestra
I — Band
J — Brass Choir
K — Percussion
L — Clarinet Choir
M — Saxophone
N — String
O — Woodwind Quintet
P — Keyboard
Q — Chamber Orchestra
R — Instrumental Consort
S — Twentieth Century
T — Jazz
U — Guitar
Z — University Chorus

Three laboratory hours per week. Rehearsal and performance of selected works for small ensembles of instruments, piano, or small vocal groups. After two registrations in MUSC 129, the student will elect MUSC 229 for two additional semesters, and MUSC 329 thereafter. In addition to indicating the course number (129, 229, 329) the student will indicate a suffix.

MUSC 330 History of Music. (3) Prerequisites, MUSC 130 or 131 and junior standing. A study of musical styles from their origins in Western Europe to their present-day manifestations. The interaction of music and other cultural activities. This course covers the Greek period to Bach.

MUSC 331 History of Music. (3) Prerequisites, MUSC 130 or 131 and junior standing. A study of musical styles from their origins in Western Europe to their present-day manifestations. The interaction of music and other cultural activities. This course covers Bach to the present.

MUSC 338 Special Topics in Music and Art. (3) Open to non-majors and majors in art or music; (Cross-listed with ARTH 338). Repeatable to a maximum of 6 credits.

MUSC 339 Honors Reading Course. (2-3) Prerequisites, junior standing and consent of honors committee. Selected readings in the history, literature and theory of music. The course may be repeated for credit at the discretion of the committee.

MUSC 358 Aural Musical Skills. (3) Development of advanced skills in aural perception of pitch, melody, rhythm, harmony, text, texture, and timbre heard in a variety of media. A development course for graduate students. May be repeated for credit.

MUSC 379 Opera Workshop. (2) Ten hours per week. Open to music and non-music majors (by audition). Operatic production and performance, performance techniques and coaching, stage direction, set design, costume design, and make-up. Repertoire will include smaller operatic works, excerpts, or scenes. Repeatable to a maximum of eight credits.

MUSC 400 Music Pedagogy. (3) Conference course. Prerequisite or corequisite, MUSC 418, or a more advanced course in applied music. A study of major pedagogical treatises in music, and an evaluation of pedagogical techniques, materials, and procedures.

MUSC 428 Repertoire Coaching of Vocal or Chamber Music. (2) Prerequisite or co-requisite, MUSC 328. A course for piano students who wish to go further than the work offered in MUSC 128, 228, and 328 by becoming specialists in the areas of vocal coaching or chamber music coaching. Elements of pedagogy, conducting, and responsible artistic decision-making for the entire musical production.

MUSC 429 Opera Theater. (2-3) Ten hours per week. Open to music and non-music majors with consent of director. Advanced techniques of operatic production; preparation, rehearsal, and performance of operatic works from both the traditional and contemporary repertory. Repeatable to a maximum of twelve credits.

MUSC 430 Music Literature Survey for the Non-Major. (3) Prerequisite, MUSC 130 or the equivalent. Open to all students except music and music education majors. Selected compositions are studied from the standpoint of the informed listener. Choral music, opera, and art song.

MUSC 431 Music Literature Survey for the Non-Major. (3) Prerequisite, MUSC 130 or the equivalent. Open to all students except music and music-education majors. Selected compositions are studied from the standpoint of the informed listener. Orchestral, chamber, and keyboard music.

MUSC 432 Music in World Cultures I. (1) Folk idioms of Eastern and Western Europe, and the Americas; American Indian musics. Historical, social, and cultural context; musical instruments; theoretical systems, form, and aesthetics; major representative musical and theatrical genres.

MUSC 433 Music in World Cultures II. (3) Art musics of Asia, including China, Japan, India, Indonesia, and Arabia-Persia. Historical, social, and cultural context; musical instruments; theoretical systems, form, and aesthetics; major representative musical and theatrical genres.

MUSC 436 Jazz: Then and Now. (3) Major styles and influential artists of the past 75 years of jazz.

MUSC 438 Area Studies in Ethnomusicology. (3) Prerequisite, MUSC 432 or 433 or equivalent. Advanced study of musics in selected regions of the world. Repeatable to a maximum of nine credits provided content is different.

MUSC 439 Collegium Musicum. (1) Prerequisite, permission of the instructor. Open to undergraduates and graduates, music majors and non-majors. Procurement, edition, and performance of music not belonging to a standard repertory: early music, compositions for unusual performing media, works which demand reconstruction of their original circumstances of performance. Outcome of a semester's work may be one or more performances for the public. May be repeated for credit five times.

MUSC 443 Solo Vocal Literature. (3) Prerequisite, MUSC 330, 331 or the equivalent. The study of solo vocal literature from the baroque cantata to the art song of the present. The lied, melodie, vocal chamber music, and the orchestral song are examined.

MUSC 445 Survey of the Opera. (3) Prerequisite, MUSC 330, 331, or the equivalent. A study of the music, librettos and composers of the standard operas.

MUSC 448 Special Topics in Music. (2-6) Prerequisite, permission of the instructor. Repeatable to a maximum of six semester hours.

MUSC 450 Musical Form. (3) Prerequisite, MUSC 250, 251. A study of the organizing principles of musical composition, their interaction in musical forms, and their functions in different styles.

MUSC 451 Analysis of Music. (3) Prerequisite, MUSC 450 or permission of instructor. An advanced course in the analysis of tonal music. Discussion of individual works, with emphasis on their unique characteristics and on the relation of analysis to performance.

MUSC 452 Keyboard Harmony. (2) Prerequisites, MUSC 209A, MUSC 251 or the equivalents. Three laboratory hours per week. Basic instruction in the interpretation of musical scores for larger ensembles at the keyboard. Realization of basso countinua parts under performance conditions.

MUSC 453 Class Study of Guitar and Recorder. (2) Prerequisite, consent of instructor or any four of the following: MUSC 102, 103, 113, 114, 116, 117, 120, 121, 202, 203. Three hours per week. Study and development of instrumental technique, pedagogical practices, and materials relating to group performance.

MUSC 459 Electronic Composition. (2) Prerequisite, MUSC 250 and permission of instructor. A basic course in the theory and practice of electronic music, including an investigation of the nature of electronically-generated sound and its modulation in the voltage-controlled studio. Primarily for composition and theory majors. May be repeated once for credit.

MUSC 460 Counterpoint. (2) Prerequisite, MUSC 250, 251. A course in Eighteenth-century contrapuntal techniques. Study of devices of imitation in the invention and the choral prelude. Original writing in the smaller contrapuntal forms.

MUSC 461 Counterpoint. (2) Prerequisite, MUSC 250, 251. A course in eighteenth-century contrapuntal techniques. Study of devices of imitation in the invention and the choral prelude. Original writing in the smaller contrapuntal forms.

MUSC 462 Modal Counterpoint. (2) Prerequisite, MUSC 251 or the equivalent. An introduction to the contrapuntal techniques of the sixteenth century: the structure of the modes, composition of modal melodies, and contrapuntal writing for two, three and four voices.

MUSC 465 Canon and Fugue. (3) Prerequisite, MUSC 461 or the equivalent. Composition and analysis of the canon and fugue in the styles of the eighteenth, nineteenth and twentieth centuries.

MUSC 466 Structural Counterpoint. (3) Prerequisite, MUSC 461 or permission of

instructor. A study of counterpoint not so much in terms of technique as in its role of articulating large-scale tonal structures. Emphasis on analysis as well as written exercises.

MUSC 467 Piano Pedagogy I. (3) A study of major pedagogical treatises in music, and an evaluation of pedagogical techniques, materials, and procedures.

MUSC 468 Piano Pedagogy II. (3) Prerequisite, MUSC 467. Application of the studies begun in MUSC 467 to the actual lesson situation. Evaluation of results. May be repeated once for credit.

MUSC 470 Harmonic and Contrapuntal Practices of the Twentieth Century. (2) Prerequisites, MUSC 251 and 460 or the equivalents. A theoretical study of twentieth-century materials: scales, modes, intervals, chord structures, poly-harmony, and serial and twelve-tone organization.

MUSC 471 Contemporary Compositional Techniques. (2) Prerequisite, MUSC 470 or permission of instructor. Continuation of MUSC 470, with emphasis on the analysis of individual works written since 1945.

MUSC 478 Composition. (2) Prerequisite, MUSC 250, 251. Principles of musical composition, and their application to the smaller forms. Original writing in nineteenth and twentieth century musical idioms for various media.

MUSC 479 Composition. (2) Prerequisite, MUSC 250, 251. Principles of musical composition, and their application to the smaller forms. Original writing in nineteenth and twentieth century musical idioms for various media.

MUSC 480 Music in Antiquity and the Middle Ages. (3) Survey of western music from Hellenic times to 1450.

MUSC 481 Music in the Renaissance. (3) Survey of western music from 1450 to 1600.

MUSC 482 Music in the Baroque Era. (3) Survey of western music from 1600 to 1750.

MUSC 483 Music in the Classic Era. (3) Survey of western music from 1750 to 1820.

MUSC 484 Music in the Romantic Era. (3) Survey of western music from 1820 to 1900.

MUSC 485 Music in the 20th Century. (3) Survey of western music from 1900 to the present.

MUSC 486 Orchestration. (2) Prerequisite, MUSC 250, 251. A study of the ranges, musical functions, and technical characteristics of the instruments, and their color possibilities in various combinations. Practical experience in orchestrating for small and large ensembles.

MUSC 487 Orchestration. (2) Prerequisite, MUSC 250, 251. A study of the ranges, musical functions, and technical characteristics of the instruments, and their color possibilities in various combinations. Practical experience in orchestrating for small and large ensembles.

MUSC 490 Conducting. (2) A laboratory course in conducting vocal and instrumental groups. Baton technique, score reading, rehearsal techniques, tone production, style, and interpretation. Music of all periods will be introduced.

MUSC 491 Conducting. (2) Prerequisite, MUSC 490 or equivalent. A laboratory course in conducting vocal and instrumental groups. Baton technique, score reading, rehearsal techniques, tone production, style, and interpretation. Music of all periods will be introduced.

MUSC 492 Keyboard Music I. (3) The history and literature of harpsichord and solo piano music from its beginning to the Romantic period. Emphasis is placed on those segments of repertoire which are encountered in performance and teaching situations at the present time.

MUSC 493 Keyboard Music II. (3) Prerequisite, MUSC 492. The history and literature of harpsichord and solo piano music from the Romantic period to the present. Emphasis is placed on those segments of repertoire which are encountered in performance and teaching situations at the present time.

MUSC 495 Acoustics for Musicians. (3) Prerequisites, MUSC 251 or the equivalent, and senior or graduate standing in music. The basic physics of music, acoustics of musical instruments and music theory, physiological acoustics, and musico-architectural acoustics.

MUSC 499 Independent Studies. (2-3) Prerequisite, permission of instructor. Independent research on a topic chosen in consultation with the instructor, which may culminate in a paper or appropriate project. May be repeated once for credit.

Music Performance

Music Performance Courses Are Available in Three Series:

Minor Series: 2-credits each course. Half-hour lesson and six practice hours per week. Prerequisite: permission of department chairman and the next lower course on the same instrument. Intended for either music majors studying a secondary instrument or non-music majors.
MUSP 102, 103 Freshman Courses.
MUSP 202, 203 Sophomore Courses.
MUSP 302, 303 Junior Courses.
MUSP 402, 403 Senior Courses.

Principal Series: 2 or 4 credits each course. One-hour lesson and 6-practice hours per week if taken for 2-credits; or one-hour lesson and 15-practice hours per week if taken for 4-credits. Prerequisite: permission of department chairman and the next lower course on same instrument. Intended for majors in music programs other than performance.
MUSP 109, 110 Freshman Courses.
MUSP 207, 208 Sophomore Courses.
MUSP 405, 406 Junior Courses.
MUSP 409, 410 Senior Courses. Recital required in MUSP 410.

Major Series: 2 or 4 credits each course. One-hour lesson and six practice hours per week if taken for 2-credits; or one-hour lesson and fifteen practice hours per week if taken for 4-credits. Prerequisite: permission of department chairman and the next lower course on same instrument. Intended for students majoring in performance.
MUSP 119, 120 Freshman Courses.
MUSP 217, 218 Sophomore Courses.
MUSP 415, 416 Junior Courses.
MUSP 419, 420 Senior Courses. Recital required in MUSC 420.

Instrument Designation: Each student taking a music performance course must indicate the instrument chosen by adding a suffix to the proper course number, such as: MUSP 102A music performance — piano.

Suffix Instrument. A—Piano, B—Voice, C—Violin, D—Viola, E—Cello, F—Bass, G—Flute, H—Oboe, I—Clarinet, J—Bassoon, K—Saxophone, L—Horn, M—Trumpet, N—Trombone, O—Tuba, P—Euphonium, Q—Percussion, R—Organ, S—Guitar, T—Composition, U—, V—, W—, X—Hist. Inst.—Keyboard, Y—Hist. Inst.—Strings, Z—Hist. Inst.—Winds.

Nutritional Science

NUSC 402 Fundamentals of Nutrition. (3) Three lectures per week. A study of the fundamental role of all nutrients in the body, including their digestion, absorption and metabolism. Dietary requirements and nutritional deficiency syndromes of laboratory and farm animals and man will be considered. This course will be for both graduate and undergraduate credit, with additional assignments given to the graduate students.

NUSC 403 Applied Animal Nutrition. (3) Two lectures and one laboratory period per week. Prerequisites, MATH 110, NUSC 402 or permission of instructor. A critical study of those factors which influence the nutritional requirements of ruminants, swine and poultry. Practical feeding methods and procedures used in formulation of economically efficient rations will be presented.

NUSC 415 Maternal, Infant and Child Nutrition. (2) Prerequisite, course in basic nutrition. Nutritional needs of the mother, infant and child and the relation of nutrition to physical and mental growth.

NUSC 425 International Nutrition. (2) Two lectures a week. Prerequisite, course in basic nutrition. Nutritional status of world population and local, national, and international programs for improvement.

NUSC 435 History of Nutrition. (2) Two lectures per week. Prerequisite, course in basic nutrition. A study of the development of the knowledge of nutrition and its interrelationship with social and economic development.

NUSC 450 Advanced Human Nutrition. (3) First semester. Two lectures and one two-hour laboratory. Prerequisites, NUSC 402 or NUTR 300, CHEM 461, 462 or concurrent registration or permission of instructor. A critical study of the physiological and metabolic influences on nutrient utilization, particular emphasis on current problems in human nutrition.

NUSC 460 Therapeutic Human Nutrition. (3) Second semester. Prerequisite, NUSC 402 or NUTR 300. Two lectures and laboratory period per week. Modification of normal adequate diet to meet human nutritional needs in pathological conditions.

NUSC 463 Nutrition Laboratory. (2) Prerequisite, ANSC/NUSC 401 or concurrent registration. Six hours of laboratory per week. Digestibility studies with ruminant and monogastric animals, proximate analysis of various food products, and feeding trials demonstrating classical nutritional deficiencies in laboratory animals.

Nutrition

NUTR 100 Elements of Nutrition. (3) Three lectures per week. Fundamentals of human nutrition. Nutrient requirements related to changing individual and family needs. Credit will be given for only one course: NUTR 100 or NUTR 200.

NUTR 200 Nutrition for Health Services. (3) Prerequisites, CHEM 103, ZOOL 101. Two lectures and one two-hour laboratory. A study of nutritional status and the effect of food habits and food consumption on family health. Nutritional requirements for individuals in different stages of development. Techniques and procedures for the application of nutrition knowledge with consideration of various economic levels and social backgrounds. Not open to majors in the department of food, nutrition and institutional administration.

Credit will be given for only one course: NUTR 100 or NUTR 200.

NUTR 300 Science of Nutrition. (4) Prerequisites, NUTR 100, ZOOL 202 and CHEM 104, or consent of instructor. Three lectures and one two-hour laboratory. An understanding of the chemical and physiological utilization of nutrients present in food as related to individual human nutrition status; digestion and absorption, requirements and deficiencies.

NUTR 415 Maternal, Infant and Child Nutrition. (2) Two lectures per week. Prerequisite, course in basic nutrition. Nutritional needs of the mother, infant and child and the relation of nutrition to physical and mental growth.

NUTR 425 International Nutrition. (2) Two lectures per week. Prerequisite, course in basic nutrition. Nutritional status of world population and local, national and international programs for improvement.

NUTR 435 History of Nutrition. (2) Two lectures per week. Prerequisite, course in basic nutrition. A study of the development of the knowledge of nutrition and its interrelationship with social and economic developments.

NUTR 450 Advanced Human Nutrition. (3) Prerequisites, consent of department; NUTR 300 and CHEM 261 or concurrent registration in CHEM 462. Two lectures and one two-hour laboratory. A critical study of the physiological and metabolic influences on nutrient utilization, with particular emphasis on current problems in human nutrition.

NUTR 460 Therapeutic Human Nutrition. (3) Two lectures and one laboratory period a week. Prerequisites, NUTR 300, 450. Modifications of the normal adequate diet to meet human nutritional needs in pathological conditions.

NUTR 470 Community Nutrition. (3) Prerequisites, NUTR 300, 450, 460. A study of different types of community nutrition programs, problems and projects.

NUTR 480 Applied Diet Therapy. (3) Open only to students accepted into and participating in the U.S. Army Dietetic internship program at Walter Reed General Hospital or the coordinated undergraduate dietetics program. Application of principles of normal and therapeutic nutrition in total medical care and instruction of patients. Clinical experiences in hospital therapeutics, pediatrics, research and a variety of clinics are included. For students in the coordinated undergraduate dietetics program, 238 hours of clinical experience is required and this course must be accompanied by NUTR 460.

NUTR 485 Applied Community Nutrition. (3) Prerequisite, NUTR 460 and concurrent registration in NUTR 470. Open only to students accepted into and participating in the coordinated undergraduate program in dietetics. Application of principles in community nutrition through guided experiences in different aspects of nutrition programs in the community. This course requires 238 hours of clinical experience.

NUTR 490 Special Problems in Nutrition. (2-3) Prerequisites, NUTR 300 and consent of instructor. Individual selected problems in the area of human nutrition.

NUTR 498 Special Topics. (1-3) Prerequisite, consent of instructor. Selected current aspects of nutrition. Repeatable to a maximum of six credits if the subject matter is substantially different.

Physical Education

PHED Basic Program Courses (1)
PHED 100-127 Physical Education Activities — Men
PHED 130-157 Physical Education Activities — Women
PHED 158 Adapted Physical Education — Coed
PHED 160-177 Physical Education Activities — Coed

PHED Professional Program Courses:

PHED 180 Introduction to Physical Education. (2) An orientation to the profession, including the relationship of physical education to education, current trends and practices, career opportunities, and areas of research.

PHED 181 Fundamentals of Movement. (2) Three hours a week. Introduction to analysis of muscular activity, conditioning exercises and programs, improvement of physical fitness and analysis of the relationships of mechanical principles to basic movement and skills.

PHED 182 Rhythmic Activities. (2) Six hours a week. Development of rhythmic sensitivity through analysis of rhythm and its application to movement, skills in folk, square and social dance, teaching techniques for use in schools and recreational programs.

PHED 183 Elementary School Rhythmic Activities. (2) A discussion of preparation and active participation in expressive and rhythmical movement activities for the elementary school age child. Educational dance, creative dances and rhythms are considered.

PHED 184 Elementary School Skills and Self-Testing Activities. (2) A discussion of preparation and active participation in educational gymnastics and functional movement skills suitable for elementary school children.

PHED 200 Apparatus Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in apparatus.

PHED 201 Archery Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in archery.

PHED 202 Badminton Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in badminton.

PHED 203 Baseball Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in baseball.

PHED 204 Basketball Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in basketball.

PHED 205 Bowling Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in bowling.

PHED 206 Golf Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in golf.

PHED 207 Fencing Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in fencing.

PHED 210 Field Games Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in field games as flag football, soccer, speedball and speed-a-way.

PHED 211 Field Hockey Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in field hockey.

PHED 212 Football Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in football.

PHED 213 Lacrosse Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in lacrosse.

PHED 214 Soccer Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in soccer.

PHED 215 Softball Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in softball.

PHED 216 Tumbling and Balancing Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in tumbling and balancing.

PHED 217 Tennis Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in tennis.

PHED 218 Laboratory in Teaching. (1) Prerequisite, students are eligible who have completed a minimum of 36 semester hours of credit with appropriate knowledge and experience in the selected activity area or with permission of instructor. The course is designed to prepare the student for the student teaching experience by assisting in a class. May be repeated to a maximum of 2 credit hours.

PHED 220 Track and Field Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in track and field.

PHED 221 Volleyball Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in volleyball.

PHED 222 Weight Training Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in weight training.

PHED 223 Wrestling Skills Laboratory. (1) Progressive techniques of teaching and practice of skills in wrestling.

PHED 282 Techniques of Officiating. (1) Emphasis on mechanics and techniques involved with officiating various sports. Opportunity to qualify for officials' ratings in sports such as basketball, field hockey and volleyball.

PHED 287 Sport and American Society. (3) Sport will be related to such social problems as delinquency, segregation, collective behavior, and leisure; to social processes such as socialization, stratification, mobility, and social control; and to those familiar social institutions, the family, the school, the church, the military, the economy, the polity, and the mass media.

PHED 289 Topical Investigations. (1-6) Independent study by an individual student or a group of students in special areas of knowledge not covered by regularly scheduled courses. Repeatable to a maximum of 6 credits.

PHED 301 Organization and Officiating in Intramurals. (1) Organization, administration, and promotion of intramurals at various school levels. Included are types of tournaments, units of competition, handling of student leader personnel.

PHED 303 Organization and Officiating in Intramurals. (1) Organization, administration, and promotion of intramurals at various school levels. Included are types of tournaments, units of competition, handling of student leader personnel.

PHED 304 Advanced Basketball Skills Laboratory. (2) Progressive techniques of teaching and practice of skills in basketball at the advanced level. Prerequisite, PHED 204 or equivalent.

PHED 306 Advanced Golf Skills Laboratory. (2) Progressive techniques of teaching and practice of skills in golf at the advanced level. Prerequisite, PHED 206 or equivalent..

PHED 314 Methods in Physical Education for Secondary Schools. (3) Three lecture hours a week. Application of educational philosophy and principles to class organization and techniques of teaching physical education in the junior and senior high schools. Students are normally enrolled during the student teaching semester.

PHED 315 Methods of Aquatics. (2) Training for aquatic leadership in schools, camps and clubs. Included are teaching methods, organization and administration, analysis of the basic and competitive swimming strokes, diving, and equipment and pool maintenance. Prerequisite, WSI or instructor's permission.

PHED 316 Advanced Gymnastics Skills Laboratory. (2) An analytical approach to teaching basic through advanced skills in gymnastics. Emphasis is placed on spotting, evaluating, and the solving of motor performance problems. Prerequisite, PHED 200 and PHED 216 or equivalent.

PHED 317. Advanced Tennis Skills Laboratory. (2) Progressive techniques of teaching and practice of skills in tennis at the advanced level. Prerequisite, PHED 217 or equivalent.

PHED 323 Coaching Athletics. (2) Two lecture hours a week. Theory of coaching the various competitive sports commonly found in high school and college programs.

PHED 324 Coaching Athletics. (2) General theory and practice of coaching selected competitive sports found in the secondary schools and community recreation programs.

PHED 325 Coaching Athletics. (2) Two lecture hours a week. Theory of coaching the various competitive sports commonly found in high school and college programs.

PHED 326 Coaching Athletics. (2) Two lecture hours a week. Theory of coaching the various competitive sports commonly found in high school and college programs.

PHED 330 Fundamentals of Body Dynamics (3) Acquaintance of the elementary teacher with the scientific principles of mechanical-anatomical analysis and physiology of activities relating to physical growth and development.

PHED 333 Adapted Physical Education (2) Lecture and lab. Application of kinesiological and physiological principles to handicapped students; designed to help prospective teachers meet exercise needs of those pupils with disabilities.

PHED 335 Swimming Pool Management. (2) Analysis of the position of the swimming pool manager. The systematic treatment of swimming pool water; swimming pool first aid; and laws pertaining to swimming pool operation. Qualifies the student for a pool operator's license in most Maryland counties.

PHED 381 Advanced Training and Conditioning. (3) Three hours a week. Theoretical and practical foundations of the prevention, recognition and treatment of athletic injuries. Physical conditioning and re-conditioning, preventive taping, first aid, and various modalities are emphasized.

PHED 389 Topical Investigations. (1-3) Independent study by an individual student or a group of students in special areas of knowledge not covered by regularly scheduled courses repeatable to a maximum of six credits.

PHED 398 Honors Seminar (1) H — Honors. Prerequisite, participation in honors program. One discussion period a week. Guided discussion of research topics of current interest. Repeatable to a total of 3 hours credit.

PHED 399 Honors Thesis. (3) H — Honors. Prerequisite, PHED 398H and candidacy for honors in physical education. Advisement will be on the individual basis. Thesis must be defended in the honors seminar.

PHED 400 Kinesiology. (4) Three lectures and two laboratory hours a week. Prerequisites, ZOOL 101, 201, and 202 or the equivalent. The study of human movement and the physical and physiological principles upon which it depends. Body mechanics, posture, motor efficiency, sports, the performance of atypical individuals, and the influence of growth and development upon motor performance are studied.

PHED 420 Physical Education for the Elementary School. (3) Orientation of the general elementary teacher to physical education. Principles and practices in elementary physical education are discussed and a variety of appropriate activities are considered.

PHED 450 The Psychology of Sports. (3) Three hours a week. An exploration of the personality factors, including, but not limited to motivation, aggression and emotion, as they affect sports participation and motor skill performance.

PHED 455 Physical Fitness of the Individual. (3) A study of the major physical fitness problems confronting the adult modern society. Consideration is given to the scientific appraisal, development, and maintenance of fitness at all age levels. Such problems as obesity, weight reduction, chronic fatigue, posture, and special exercise programs are explored. Open to persons outside the profession of physical education.

PHED 460 Physiology of Exercise. (3) Two lectures and two laboratory hours a week. Prerequisites, ZOOL 101, 201 and 202; PHED 400 or the equivalent. A study of the physiology of exercise, including concepts of work, muscular contraction, energy transformation, metabolism, oxygen debt, and nutrition and athletic performance. Emphasis is placed on cardiovascular and respiratory function in relation to physical activity and training.

PHED 480 Measurement in Physical Education. (3) Two lectures and two laboratory periods a week. Prerequisite, MATH 105 or 110. A study of the principles and techniques of educational measurement as applied to teaching of physical education; study of the functions and techniques of measurement in the evaluation of student progress toward the objectives of physical education and in the evaluation of the effectiveness of teaching.

PHED 485 Motor Learning and Skilled Performance. (3) Prerequisites, PHED 480 and PSYC 100. A study of the research dealing with motor learning and motor performance. Major topics discussed are scientific methodology, individual differences, specificity, proprioceptive control of movement, motivation, timing, transfer, and retention.

PHED 487 Physical Education and Sport in Contemporary Cultures. (3) Three lectures a week. Prerequisite, SOCY 100 or the equivalent. A study of the cultural impact of physical education activities in the United States and selected countries. Individual research on selected topics is required.

PHED 489 Field Laboratory Projects and Workshop. (1-6) Workshops and research projects in special areas of knowledge not covered by regularly structured courses. Note: the maximum total number of credits that may be earned toward any degree in physical education is six.

PHED 490 Organization and Administration of Physical Education. (3) The application of the principles of administration and supervision to physical education and intramurals. Students are normally enrolled during the student teaching semester.

PHED 491 The Curriculum in Elementary School Physical Education. (3) Techniques planning and construction are considered from a standpoint of valid criteria for the selection of content in elementary school physical education. Desirable features of cooperative curriculum planning in providing for learning experiences will be presented and discussed.

PHED 493 History and Philosophy of Sport and Physical Education. (3) History and philosophical implications of sport and physical education through ancient, medieval, and contemporary periods in western civilization.

PHED 495 Organization and Administration of Elementary School Physical Education. (3) Prerequisite, PHED 420. Studies the procedures basic to satisfactory organization of all phases of the elementary school physical education program. Emphasis is placed on the organizational and administrative factors necessary for the successful operation of the program in various types of elementary schools.

PHED 496 Quantitative Methods. (3) Statistical techniques most frequently used in research pertaining to physical education. Effort is made to provide the student with the necessary skills, and to acquaint him with the interpretations and applications of these techniques.

PHED 497 Independent Studies Seminar. (3) Discussions of contemporary issues vital to the discipline, critiques of research in the student's area/areas of special interest, completion of a major project where the student will be asked to demonstrate the ability to carry out investigative processes in problem solving and critical writing under faculty direction.

Philosophy

PHIL 100 Introduction to Philosophy. (3) An introduction to some of the main problems of philosophy, and to some of the main ways of dealing with these problems.

PHIL 140 Ethics. (3) An introduction to moral philosophy, including a critical examination of some important classic and contemporary systems of ethics, such as those of Aristotle, Kant, Mill, and Dewey.

PHIL 170 Elementary Logic and Semantics. (3) An introductory study of logic and language, intended to help the student increase his ability to employ language with understanding and to reason correctly. Topics treated include the use and abuses of language, techniques for making sound inferences and the logic of science.

PHIL 207 Introduction to Chinese Philosophy. (3) A study of the major themes in Chinese philosophy from the beginnings to the decline of Buddhism around 1000 A.D. Special emphasis on writings from the classical period, including those of the Confucians, the Mohists, the Taoists, and the Logicians.

PHIL 209 Philosophical Issues. (3) An examination of selected philosophical issues of general interest. May be repeated to a maximum of 6 hours for credit when the issues dealt with are different.

PHIL 233 Philosophy in Literature. (3) Reading and philosophical criticism of novels and dramas containing ideas significant for ethics, social policy and religion.

PHIL 236 Philosophy of Religion. (3) This course seeks to provide the student with the means by which he may approach intelligently the main problems of religious thought: the nature of religious experience, the forms of religious expression, the conflicting claims of religion and science, and the place of religion in the community and in the life of the individual.

PHIL 250 Philosophy of Science I. (3) An introduction to the main issues in the philosophy of science, giving special attention to the ways scientific developments have influenced the philosophy of science and how philosophy of science has influenced scientific progress. Case studies of selected historical episodes in which science and philosophy have interacted significantly, focusing on the physical, biological, or social sciences.

PHIL 271 Symbolic Logic I. (3) An introduction to the formal analysis of deductive reasoning through formalization of arguments, truth table and natural deduction techniques for propositional logic and quantification theory, including identity and definite descriptions.

PHIL 305 Philosophy in America. (3) Prerequisite, six hours in philosophy. A survey of philosophical thought in America from the eighteenth century to the present. Special attention is given to Edwards, Jefferson, Emerson, Royce, Peirce, James, and Dewey.

PHIL 308 Studies in Contemporary Philosophy. (3) Prerequisite, six hours in philosophy. Problems, issues, and points of view of current interest in philosophy. May be repeated for credit when the topics dealt with are different. Repeatable to a maximum of six hours.

PHIL 310 Ancient Philosophy. (3) Prerequisite, six hours in philosophy. A history of Greek thought from its beginnings to the time of Justinian. The chief figures discussed: the pre-Socratic philosophers, Socrates, Plato, Aristotle, Epicurus, the Stoic philosophers, and Plotinus.

PHIL 320 Modern Philosophy. (3) Prerequisite, six hours in philosophy. A history of philosophical thought in the west during the 16th, 17th, and 18th centuries. The chief figures discussed: Bacon, Galileo, Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, and Kant.

PHIL 325 Nineteenth Century Philosophy. (3) Prerequisite, six hours in philosophy. A survey of philosophy in the nineteenth century through a consideration of such writers as Hegel, Schopenhauer, Nietzsche, Spencer, Marx, Comte, Mill, Mach, and Bradley.

PHIL 326 Twentieth Century Philosophy. (3) Prerequisite, six hours in philosophy. A survey of philosophy in the twentieth century through a consideration of representative figures in England, Europe and America. Among the theories to be studied are logical atomism (Russell, Wittgenstein), positivism (Carnap, Ayer), existentialism and phenomenology (Sartre, Husserl), naturalism and realism (Dewey, Santayana).

PHIL 328 Studies in the History of Philosophy. (3) Prerequisite, six hours in philosophy. Problems, issues, and points of view in the history of philosophy. May be repeated for credit when the topics dealt with are different. Repeatable to a maximum of six hours.

PHIL 330 Philosophy of Art. (3) An examination of the fundamental concepts in art and in esthetic experience generally. Readings from the works of artists, estheticians, critics and philosophers.

PHIL 342 Moral Problems in Medicine. (3) Prerequisite, PHIL 100 or 140 or consent of instructor. A critical examination of the moral dimensions of decision-making in health-related contexts. Readings are drawn from philosophical, medical, and other sources.

PHIL 343 Sexual Morality. (3) A critical examination of practical moral issues bearing on sexual conduct, using the resources of moral and social philosophy.

PHIL 345 Political and Social Philosophy I. (3) An introduction to political philosophy, including a critical examination of classic and contemporary political theories, such as those of Plato, Hobbes, Locke, Rousseau, Mill, and Marx.

PHIL 360 Philosophy of Language. (3) Prerequisite, PHIL 170 or 271. An inquiry into the nature and function of language and other forms of symbolism.

PHIL 399 Honors Seminar. (3) Open to honors students in philosophy and, by permission of the instructor, to honors students in other departments. Research in selected topics, with group discussion. May be repeated for credit when the topics dealt with are different.

PHIL 408 Topics in Contemporary Philosophy. (3) Prerequisite, PHIL 320. An intensive examination of contemporary problems and issues. Source material will be selected from recent books and articles. May be repeated for credit when the topics dealt with are different.

PHIL 412 The Philosophy of Plato. (3) Prerequisites, PHIL 310 and 320. A critical study of selected dialogues.

PHIL 414 The Philosophy of Aristotle. (3) Prerequisites, PHIL 310 and 320. A critical study of selected portions of Aristotle's writings.

PHIL 416 Medieval Philosophy. (3) Prerequisite, PHIL 310 or 320. A history of philosophic thought in the west from the close of the classical period to the Renaissance. Based on readings of the Stoics, early Christian writers, Neoplatonists, later Christian writers, and schoolmen.

PHIL 421 The Continental Rationalists. (3) Prerequisites, PHIL 310 and 320. A critical study of the systems of some of the major 17th and 18th century rationalists, with special reference to Descartes, Spinoza, and Leibniz.

PHIL 422 The British Empiricists. (3) Prerequisites, PHIL 310 and 320. A critical study of selected writings of Locke, Berkeley, and Hume.

PHIL 423 The Philosophy of Kant. (3) Prerequisites, PHIL 310 and 320. A critical study of selected portions of Kant's writings.

PHIL 428 Topics in the History of Philosophy. (3) Prerequisites, PHIL 310 and 320, or consent of instructor. May be repeated for credit when the topics dealt with are different.

PHIL 438 Topics in Philosophical Theology. (3) Prerequisite, PHIL 236 or consent of instructor. An examination of a basic issue discussed in theological writings, with readings drawn from both classical and contemporary theologians and philosophers. May be repeated to a maximum of six credits when the topics are different.

PHIL 440 Ethical Theory. (3) Prerequisite, PHIL 140. Contemporary problems having to do with the meaning of the principal concepts of ethics and with the nature of moral reasoning.

PHIL 445 Political and Social Philosophy II. (3) Prerequisite, PHIL 140 or 345. A systematic treatment of the main philosophical issues encountered in the analysis and evaluation of social (especially political) institutions.

PHIL 447 Philosophy of Law. (3) Prerequisite, one course in philosophy. Examination of fundamental concepts related to law, e.g., legal system, law and morality, justice, legal reasoning, responsibility.

PHIL 450 Scientific Thought I. (3) The development of science, its philosophical interpretations and implications, and views of its methods, from the ancients through Newton and Leibniz.

PHIL 451 Scientific Thought II. (3) The development of science, its philosophical interpretations and implications, and views of its methods, from the death of Newton to the early twentieth century.

PHIL 452 Philosophy of Physics. (3) Prerequisites, PHYS 142, 263, or 294, or permission of instructor. Investigation of the implications of 20th-century physics for such problems as operationalism, the structure and purposes of scientific theories, the meaning of 'probability', the basis of geometrical knowledge, the Copenhagen interpretation of quantum mechanics, the nature and limits of measurement. Interaction between physics and philosophy will be stressed throughout.

PHIL 453 Philosophy of Science II. (3) Prerequisite, PHIL 250 or an upper-division course in philosophy or a major in science or permission of the instructor. A comprehensive survey of developments in the main problems of philosophy of science from logical positivism to the present. The nature of theories, models, laws and counterfactuals, testing, inductive logic and confirmation theory, experimental methodology, measurement, explanation, concept formation, scientific change, and scientific realism.

PHIL 455 Philosophy of the Social Sciences. (3) Prerequisite, PHIL 250 or six hours in a social science or consent of the instructor. A consideration of philosophical issues arising in the social sciences, with particular emphasis on issues of practical methodological concern to social scientists.

PHIL 456 Philosophy of Biology. (3) Prerequisite PHIL 250 or permission of the instructor. Questions about concepts, reasoning, explanation, etc., in biology and their relations to those of other areas of science. Case studies of selected aspects of the history of biology, especially in the twentieth century.

PHIL 457 Philosophy of History. (3) An examination of the nature of historical knowledge and historical explanation, and of theories of the meaning of world history.

PHIL 458 Topics in the Philosophy of Science. (3) Prerequisite, PHIL 250 or consent of the instructor; when the topic for a given semester demands, additional philosophical or scientific prerequisites may be required by the instructor. A detailed examination of a particular topic or problem in philosophy of science. Repeatable to a maximum of six credits when the content is different.

PHIL 461 Theory of Meaning. (3) Prerequisites, PHIL 170 or 271, and 320. A study of theories about the meaning of linguistic expressions, including the verification theory and the theory of meaning as use. Among topics to be considered are naming, referring, synonymy, intension and extension, and ontological commitment. Such writers as Mill, Frege, Russell, Lewis, Carnap, Wittgenstein, Austin, and Quine will be discussed.

PHIL 462 Theory of Knowledge. (3) Prerequisites, PHIL 310 and 320. PHIL 271 is recommended. The origin, nature, and validity of knowledge considered in terms of some philosophic problems about perceiving and thinking, knowledge and belief, and language, truth and confirmation.

PHIL 464 Metaphysics. (3) Prerequisites, PHIL 310 and 320. PHIL 271 is recommended. A study of some central metaphysical concepts (such as substance, relation, causality, and time) and of the nature of metaphysical thinking.

PHIL 466 Philosophy of Mind. (3) Prerequisite, PHIL 320. An inquiry into the nature of mind through the analysis of such concepts as consciousness, perception, understanding, imagination, emotion, intention, and action.

PHIL 471 Symbolic Logic II. (3) Prerequisite, PHIL 271 or consent of instructor. Axiomatic development of the propositional calculus and the first-order functional calculus, including the deduction theorem, independence of axioms, consistency, and completeness.

PHIL 474 Induction and Probability. (3) Prerequisite, consent of instructor. A study of inferential forms, with emphasis on the logical structure underlying such inductive procedures as estimating and hypothesis-testing. Decision-theoretic rules relating to induction will be considered, as well as classic theories of probability and induction.

PHIL 478 Topics in Symbolic Logic. (3) Prerequisite, PHIL 471. May be repeated for credit when the topics dealt with are different.

PHIL 498 Topical Investigations. (1-3)

Physics

PHYS 101 Contemporary Physics. (3) Prerequisite, high school algebra. For non-science students who are interested in the evolution of scientific thought and its present day significance. Historical, philosophic, experimental and theoretical aspects of physics are presented. Topics in mechanics, relativity, electricity and magnetism, and nuclear physics are covered. Not open to students who have taken PHYS 111, 112.

PHYS 102 Physics of Music. (3) Prerequisites, high school algebra, basic knowledge of musical notation. A study of the physical basis of sound, acoustical properties of sounds, the human ear and voice, reproduction of sound, electronic music, acoustical properties of auditoriums, and other selected topics.

PHYS 106 Light, Perception, Photography, and Visual Phenomena. (3) Intended for the general student, this course will cover topics in optics which require minimal use of mathematics. Principles of optics, lenses, cameras, lasers and holography, physics of the eye, color vision and various visual phenomena such as rainbows. Credit not applicable toward the minimum requirements for a major in physics and astronomy.

PHYS 111 Physics in the Modern World. (3) The first semester of a survey course in general physics emphasizing the role that physics plays in science, technology, and society today. The course is concept oriented and minimal use of mathematics is made. Intended for the general student; does not satisfy the requirements of the professional schools.

PHYS 112 Physics in the Modern World. (3) The second semester of a survey course in general physics emphasizing the role that physics plays in science, technology, and society today. The course is concept oriented and minimal use of mathematics is made. Intended for the general student; does not satisfy the requirements of the professional school.

PHYS 114 Energy and the Environment. (4) One semester, 4 credits. A physical science course for students who wish an acquaintance with the methods and attitudes of physical science and their application to today's problems of the environment. Includes topics such as energy, sources and resources, the atmosphere, and man's interaction with it. Appropriate for non-science students.

PHYS 117 Introduction to Physics. (4) Three lectures and one two-hour laboratory per week. Prerequisite, qualification to enter MATH 110. Intended for students majoring in neither the physical nor biological sciences. A study of the development of some of the basic ideas of physical science.

PHYS 120 Physical Principles in Medical Technology. (4) Three hours of lecture plus a two hour laboratory period per week. This course is designed to acquaint medical technology students with the physics they need to understand instruments and practices used in modern medicine. Energy, heat, electronics, and radiation are some topics covered. This course does not satisfy the undergraduate course requirements of future medical and dental students.

PHYS 121 Fundamentals of Physics I. (4) Three lectures, one recitation, and one two-hour laboratory period a week. Prerequisite, previous course work in trigonometry or MATH 110 or MATH 115. The first part of a two-semester course in general physics treating the fields of mechanics, heat, sound, electricity, magnetism, optics, and modern physics. Together with PHYS 122, this generally satisfies the minimum requirement of medical and dental schools.

PHYS 122 Fundamentals of Physics II. (4) Three lectures, one recitation, and one two-hour laboratory period per week. Prerequisite PHYS 121 or the equivalent. A continuation of PHYS 121. Which together with it, generally satisfies the minimum requirement of medical and dental schools.

PHYS 141 Principles of Physics. (4) The first of a two-semester series in general physics. Three lectures, one recitation, and one two-hour laboratory per week. Concurrent enrollment in MATH 141 or the equivalent. The first semester covers the fields of mechanics, thermodynamics, and special relativity. This survey course will use calculus and is recommended for chemistry and zoology majors. It also satisfies the requirements of medical and dental schools.

PHYS 142 Principles of Physics. (4) A continuation of PHYS 141. The second semester covers the fields of waves, electricity and magnetism, optics, and modern physics.

PHYS 161 General Physics — Mechanics and Particle Dynamics. (3) Three lectures and one recitation per week. Prerequisite, MATH 141 or concurrent registration. The first semester of a three-semester calculus-based general physics course. (See PHYS 262, 263). Laws of motion, force, and energy; principles of mechanics; collisions; harmonic motion; rotation; and gravitation.

PHYS 191 Introductory Physics — Mechanics. (3) Prerequisite, a high school physics course or consent of the department. Corequisites, PHYS 195, and MATH 140 or 141. First semester of a four-semester sequence intended for physics majors or others desiring a rigorous preparation in the physical sciences: kinematics, dynamics, conservation laws, applications, kinetic theory of gases.

PHYS 192 Introductory Physics — Thermodynamics, Wave and Special Relativity. (3) Prerequisites, MATH 140, PHYS 191 and 195. Corequisites, MATH 141, PHYS 196. Second semester of a four-semester sequence intended for physics majors or others desiring a rigorous preparation in the physical sciences: thermodynamics, waves, special relativity.

PHYS 195 Introductory Physics Laboratory I. (1) Corequisite: PHYS 191. One three-hour laboratory bi-weekly alternating with two-hour demonstration discussion periods. Kinematics, dynamics, conservation laws. All reports will be done during the class period.

PHYS 196 Introductory Physics Laboratory II. (1) Corequisite: PHYS 192. One three-hour laboratory bi-weekly alternating with two-hour demonstration-discussion periods. Simple harmonic motion, waves, sound, thermodynamics, special relativity. All reports will be done during the class period.

PHYS 221 General Physics for Science Teachers I. (4) Prerequisite, a high school physics course. Pre-or corequisite, MATH 140 or 220. Three lectures, one two-hour laboratory and one recitation per week. The first part of a two-semester sequence in physics, stressing physical insight, for prospective secondary school science and mathematics teachers.

PHYS 222 General Physics for Science Teachers II. (4) Prerequisite, PHYS 221. Three lectures, one two-hour laboratory and one recitation per week. A continuation of PHYS 221.

PHYS 262 General Physics — Heat, Electricity and Magnetism. (4) Three lectures, one recitation, and one three-hour laboratory per week. Prerequisite, PHYS 161. The second semester of a calculus-based general physics course. Thermodynamic kinetic theory; electrostatics; electrodynamics; Maxwell's equations.

PHYS 263 General Physics — Waves, Relativity and Quantum Physics. (4) Three lectures, one recitation, and one three-hour laboratory per week. Prerequisite, PHYS 262. The third semester of a calculus-based general physics course. Wave motion; electromagnetic waves; refraction; interference and diffraction; special theory of relativity; quantum physics.

PHYS 293 Introductory Physics — Electricity and Magnetism. (3) Prerequisites, PHYS 192, 196, MATH 141. Corequisites, PHYS 295; MATH

241 or 240. (It is preferable to take MATH 241 before MATH 240 for this course). Third semester of a four-semester sequence intended for physics majors or others desiring a rigorous preparation in the physical sciences; phenomenological laws of electricity and magnetism, Maxwell's equations, electrical and magnetic properties of matter, applications.

PHYS 294 Introductory Physics — Optics and Modern Physics. (3) Prerequisites, PHYS 293, 295; MATH 241 or 240. Corequisites, PHYS 296; MATH 241 or 240. Fourth semester of a four-semester sequence intended for physics majors or others desiring a rigorous preparation in the physcial sciences: electromagnetic waves, geometrical and physical optics, modern physics.

PHYS 295 Introductory Laboratory in Electricity and Magnetism. (2) Corequisite, PHYS 293. One four-hour lecture-laboratory session per week. Electrostatics, magnetostatics, magnetic induction, electric and magnetic fields, AC circuits.

PHYS 296 Introductory Laboratory in Electromagnetic Waves. (2) Corequisite, PHYS 294. One four-hour laboratory-lecture session per week. Electromagnetic waves, interference and diffraction, dispersion, modern physics.

PHYS 299 Special Problems in Physics. (1-6) Prerequisite, consent of department. Research or special study to complement courses taken elsewhere which are not fully equivalent to those in departmental requirements. Credit according to work done. May be taken no more than twice. Maximum of eight credits applicable to B.S. degree program.

PHYS 305 Physics Shop Techniques. (1) One three-hour laboratory per week. Prerequisite, PHYS 365 or consent of instructor. Machine tools, design and construction of laboratory equipment.

PHYS 318 Topics in Contemporary Physics. (3) Prerequisite, PHYS 122, PHYS 112, or consent of the instructor. A survey of topics of current research and public interest. Intended for the non-physics or non-science major. Topics covered will include lasers, quantum liquids, cosmology, elementary particles and geophysics.

PHYS 365 Advanced Experiments. (2) Four hours of laboratory work per week. Prerequisite, PHYS 284 and 286 or 263. Selected fundamental experiments in electricity and magnetism, elementary electronics, and optics.

PHYS 389 Undergraduate Thesis Research. (1-6) Prerequisite, consent of advisor. Independent directed research and study on a topic selected by the student in consultation with his advisor. Final written thesis and oral defense will be expected. Enrollment limited to undergraduate physics majors. May be repeated to a maximum of six credits.

PHYS 398 Independent Studies Seminar. (1-16) Credit according to work done. Enrollment is limited to students admitted to the independent studies program in physics.

PHYS 399 Special Problems in Physics. (1-3) Two hours laboratory work a week for each credit hour. One to three credits may be taken concurrently each semester. (Will be given with sufficient demand.) Prerequisite, PHYS 365 and consent of advisor. Selected advanced experiments.

PHYS 400 Basic Concepts of Physics I. (3) Prerequisite, junior standing. A primarily descriptive course in two semesters, intended mainly for those students in the liberal arts who have not had any other course in physics. This course does not serve as a prerequisite or substitute for other physics courses. The main emphasis is on the concepts of physics, their evolution and their relation to other branches of human endeavor.

PHYS 401 Basic Concepts of Physics II. (3) Prerequisite, PHYS 400 or consent of instructor.

PHYS 404 Intermediate Theoretical Mechanics. (3) Prerequisites, PHYS 142 or 263; MATH 241 previously or concurrently. Fundamentals and selected advanced topics of physical mechanics. Vector differential calculus will be used.

PHYS 405 Intermediate Theoretical Electricity and Magnetism. (3) Prerequisite, PHYS 142 or 263; MATH 241. Intermediate electricity and magnetism and electromagnetic waves (optics). Vector differential calculus is used throughout.

PHYS 406 Optics. (3) Three lectures a week. Prerequisites, PHYS 263 or 284 and MATH 240, or consent of instructor. Geometrical optics, optical instruments, wave motion, interference and diffraction, and other phenomena in physical optics.

PHYS 407 Sound. (3) (Will be given only with sufficient demand). Prerequisite, PHYS 122, 142 or 263. MATH 240 is to be taken concurrently.

PHYS 410 Elements of Theoretical Physics — Mechanics. (4) Prerequisites, PHYS 284, or PHYS 404 and 405, or PHYS 263 and consent of instructor, and also MATH 241. A study of the theoretical foundations of mechanics, with extensive applications of the methods. Also various mathematical tools of theoretical physics.

PHYS 411 Elements of Theoretical Physics — Electricity and Magnetism. (4) Prerequisite, PHYS 404 or 410, and PHYS 263 or 284 or 405, or consent of instructor.. A study of the foundations of electromagnetic theory, with extensive application of the methods. Thorough treatment of wave properties of solutions of Maxwell's equations.

PHYS 412 Kinetic Theory of Gases. (3) Prerequisites, PHYS 404 and 405 or PHYS 410 and MATH 240 or the equivalent. Dynamics of gas particles, Maxwell-Bultzmann distribution, diffusion, Brownian motion, etc.

PHYS 414 Introduction to Thermodynamics and Statistical Mechanics. (3) Prerequisites, MATH 240, PHYS 284 or 404 or consent of instructor. Introduction of basic concepts in thermodynamics and statistical mechanics.

PHYS 420 Modern Physics for Engineers. (3) Prerequisites, PHYS 263 or 284 or 404 and 405; MATH 241 or consent of instructor.. A survey of atomic and nuclear phenomena and the main trends in modern physics. This course is appropriate for students in engineering and other physical sciences. It should not be taken in addition to PHYS 421.

PHYS 421 Introduction to Modern Physics. (3) Prerequisites, PHYS 284 or the equivalent; MATH 241 including some knowledge of ordinary differential equations. Introductory discussion of special relativity, origin of quantum theory, Bohr atom, wave mechanics, atomic structure, and optical spectra.

PHYS 422 Modern Physics. (3) Prerequisite, PHYS 421. This course uses the basic ideas of Quantum mechanics and special relativity to discuss the characteristics of many diverse subjects including complex atoms, molecules, solids, nuclei and elementary particles.

PHYS 423 Elementary Quantum Physics. (3) Prerequisites, PHYS 420 or 421; MATH 246; and a level of mathematical sophistication equivalent to that of a student who has taken PHYS 410 and 411, or ENEE 380 and 382. The quantum theory is presented in a rigorous way including the concepts of operators, measurement and angular momentum. These concepts together with the Schroedinger equation are then applied to some basic problems in atomic and molecular physics.

PHYS 429 Atomic and Nuclear Physics Laboratory. (3) Credits of PHYS 365 and consent of instructor. Classical experiments in atomic physics and more sophisticated experiments in current techniques in nuclear physics.

PHYS 431 Properties of Matter. (3) Prerequisite, PHYS 404 and 405 or 410, 420, 421. Introduction to solid state physics. Electro-magnetic, thermal, and elastic properties of metals, semiconductors and insulators.

PHYS 441 Nuclear Physics. (3) Prerequisite, PHYS 404 and 405 or 410, 420 or 421. An introduction to nuclear physics at the pre-quantum-mechanics level. Properties of nuclei; radioactivity; nuclear systematics; nuclear moments; the shell model, interaction of charged particles and gamma rays with matter; nuclear detectors; accelerators: nuclear reactions; beta decay; high energy phenomena.

PHYS 443 Neutron Reactor Physics. (3) Prerequisite, PHYS 420 or PHYS 421 or consent of instructor. Various related topics in neutron reactor physics.

PHYS 451 Introduction to Elementary Particles. (3) Prerequisite, PHYS 422 or consent of instructor. Properties of Elementary particles, production and detection of particles, relativistic kinematics, invariance principles and conservation laws.

PHYS 461 Introduction to Fluid Dynamics. (3) Prerequisites, PHYS 404 and MATH 240. Kinematics of fluid flow, properties of incompressible fluids, complex variable methods of analysis, wave motions.

PHYS 463 Introduction to Plasma Physics. (3) Three lectures a week. Prerequisites, PHYS 404 or 410, or ENES 221: and PHYS 405 or 411, or ENEE 380; or consent of instructor. Students without the electricity and magnetism prerequisite but having a familiarity with Maxwell's equations should check with the instructor. Orbit theory, magneto-hydrodynamics, plasma heating and stability, waves and transport processes.

PHYS 465 Modern Optics. (3) Prerequisites, PHYS 401 and 420 or 421, and 411 or consent of the instructor. Designed for students with a background in fundamental optics, the course deals with topics in modern optics such as coherence, holography, principles of laser action, electron optics, and non-linear optics.

PHYS 471 Introduction to Atmospheric and Space Physics. (3) Prerequisite, PHYS 404 and 405 or 410, 420 or 421. Motions of charged particles in magnetic fields, aspects of plasma physics related to cosmic rays and radiation belts, atomic phenomena in the atmosphere,

thermodynamics and dynamics of the atmosphere.

PHYS 483 Introduction to Biophysics. (3) Prerequisite, senior level standing/physics, or consent of instructor (open to students outside physics). A topical introduction to problems in biophysics: cell structure; intermolecular forces; photosynthesis; control processes including enzyme function, allosterism, cooperative transitions in biopolymers and the regulation of protein synthesis; biological rhythms; membranes including bioelectric potentials and the Hodgkin Huxley equations; muscle contraction.

PHYS 485 Electronic Circuits. (4) Three hours of lectures and two of laboratory per week. Prerequisite, PHYS 365, and concurrent enrollment in PHYS 405 or 411. Theory of semiconductor and vacuum tube circuits. Application in experimental physics.

PHYS 487 Particle Accelerators, Physical and Engineering Principles. (3) Prerequisites, PHYS 410, 411 or 271, 321 and 421, or the equivalents. Sources or charged particles, methods of acceleration and focusing of electron and ion beams in electromagnetic fields; electrostatic accelerators; constant-gradient cyclotrons and synchrotrons; betatrons and microtrons; the alternating-gradient and sector-focusing principles; isochronous syclotrons and alternating-gradient sychrotrons: linear accelerators. This course is also listed as ENEE 487.

PHYS 490 History of Modern Physics. (3) Prerequisite, PHYS 420 or 421 or the equivalent. Primarily for senior physics majors and first year graduate students. A survey of major discoveries and trends in 20th century physics, including the relations of physics to other sciences, philosophy of science, technology and society.

PHYS 499 Special Problems in Physics. (1-16) Prerequisite, major in physics and consent of advisor. Research or special study. Credit according to work done.

Portuguese

PORT 101 Elementary Portuguese. (4) Introduction to basic structures, with emphasis upon audio-lingual skills. Four recitations per week and one optional laboratory hour. Leads to 102.

PORT 102 Elementary Portuguese. (4) Completion of basic structures with increasing emphasis upon reading skill, reinforced by discussion and composition. Four recitations per week and one optional laboratory hour.

PORT 104 Intermediate Portuguese. (4) Extensive reading, discussion and composition. Four recitations per week, and one optional laboratory hour.

PORT 121 Accelerated Portuguese. (3) Limited to students who have reached the 300 level or the equivalent in Spanish and wish to acquire a reading knowledge of Portuguese in one semester. Normally leads to PORT 221. Cannot be used to satisfy the arts and humanities language requirement.

PORT 221 Introduction to Brazilian Literature. (3) Prerequisite, PORT 104. Reading of literary texts, discussion and brief written reports. Conducted in Portuguese.

PORT 399 Independent Study in Portuguese. (1-3) Prerequisite, permission of instructor. Specific readings in literature under the supervision of a faculty member of the department. Repeatable to a maximum of three credits.

PORT 478 Themes and Movements of Luso-Brazilian Literature in Translation. (3) A study of specific themes and movements in Luso-Brazilian literature, as announced. Designed for students for whom the literatures would be inaccessible in Portuguese. Repeatable to a maximum of six credits.

Psychology

PSYC 100 Introduction to Psychology. (3) A basic introductory course, intended to bring the student into contact with the major problems confronting psychology and the more important attempts at their solution. H — Honors.

PSYC 200 Statistical Methods in Psychology. (3) Prerequisite, PSYC 100 and MATH 111 or 140 or 220. A basic introduction to quantitative methods used in psychological research.

PSYC 201 Intermediate Psychology (Honors). (3) H — Honors. Usually taken during sophomore year. Prerequisite, PSYC 100H or permission of instructor. The course content will stress the interrelations among data derived from the fields of human development, cognition, perception, measurement and social processes.

PSYC 206 Developmental Biopsychology. (3) Prerequisite, PSYC 100. Biological basis of behavioral development in relation to genetic, constitutional, anatomical, psysiological, and environmental factors. Emphasis upon both phylogenetic and ontogenetic research findings in biological psychology.

PSYC 221 Social Psychology. (3) Prerequisite, PSYC 100. The influence of social factors on the individual and interpersonal behavior. Includes topics such as conformity, attitude change, person perception, interpersonal attraction and group behavior.

PSYC 301 Biological Basis of Behavior. (3) Prerequisite, PSYC 100. The experimental analysis of the behavior of humans and animals from the point of view of the biological mechanisms of behavior. Topics such as genetic determiners and physiological mechanisms, and basic principles of conditioning and learning.

PSYC 309 Special Topics in Psychology. (3) Prerequisite, PSYC 200, and major in psychology or permission of the instructor. Topics of current interest, as announced, which represent extensions of or additions to topics covered in more general topical courses. Offered on a seminar basis. Repeatable to a maximum of six credits.

PSYC 310 Perception. (3) Prerequisite, PSYC 100 or consent of instructor. A survey of phenomena and theories of perception including psychological, anatomical, physiological, and environmental factors important in determining how we perceive the world. Historical background will be examined as well as contemporary research. No credit for students who have completed PSYC 410.

PSYC 331 Introduction to Abnormal Psychology. (3) Prerequisite, PSYC 100. History of the study of psychopathology and mental health; concepts and models of psychopathology; concepts and models of positive mental health; major syndromes of deviant behavior, including psychoneurosis, psychosis, personality disorders, and affective disorders; theories of deviant behavior; and community mental health. A study may not receive credit for both PSYC 331 and PSYC 431.

PSYC 333 Child Psychology. (3) Prerequisite, PSYC 100. Behavioral analysis of normal development and normal socialization of the growing child. A student may not receive credit for both PSYC 333 and 433.

PSYC 335 Personality and Adjustment. (3) Prerequisite, PSYC 100. Introduction to psychology of human personality and adjustment. This course is designed for the student who desires a general knowledge of this area of psychology. A student may not receive credit for both PSYC 335 and 435.

PSYC 337 Introduction to Community Psychology. (3) Prerequisites, PSYC 100, 221 and 335 or 435, senior standing, and consent of instructor. Survey and critical examination of environmental factors associated with variations in individual functioning. Effects of social process and social structure in community life on individual mental health, theoretical models in community psychology, variety of additional topics within community psychology.

PSYC 361 Survey of Industrial Psychology. (3) Prerequisite, PSYC 100. A course for non-majors which provides a general survey of the field of industrial psychology; including such topics as selection training, job satisfaction, social organization, and environmental factors. A student may not receive credit for both PSYC 361 and 461.

PSYC 400 Experimental Psychology — Learning and Motivation. (4) Prerequisites, PSYC 200 and either 206 or 301. Two lectures and four one-hour laboratory periods per week. Primarily for students who major in psychology. The experimental analysis of behavior with emphasis on conditioning, learning and motivational processes. Experiments are conducted on the behavior of animals.

PSYC 401 Advanced Laboratory in the Experimental Analysis of Behavior. (3) Prerequisite, PSYC 400. An intensified extension of the principles and techniques demonstrated in the laboratory of PSYC 400. Emphasis on complex schedules of reinforcement, and experimental designs using repeated measures.

PSYC 402 Physiological Psychology. (3) Prerequisite, PSYC 206 or 301. An introduction to research on the physiological basis of human behavior, including considerations of sensory phenomena, motor coordination, emotion, drives, and the neurological basis of learning.

PSYC 403 Animal Behavior. (3) Prerequisite, PSYC 206 or 301. A study of animal behavior, including considerations of social interactions, learning, sensory processes, motivation, and experimental methods, with a major emphasis on mammals.

PSYC 404 Introduction to Behavioral Pharmacology. (3) Prerequisite, psychology 400 or permission of instructor. This course surveys the basic findings and theoretical viewpoints on the interaction of drugs and behavior. Topics include an introduction to basic principles of pharmacology, the effects of drugs on various behavior, experimental analysis of drug dependence and abuse, and neuropharmacology and behavior.

PSYC 405 Applied Behavior Analysis. (3) Prerequisite, PSYC 301. Theoretical and research literature in the application of

operant and respondent conditioning principles to human behavior. Approaches to behavior problems in school, home and professional settings.

PSYC 410 Experimental Psychology — Sensory Processes I. (4) Three lectures and one two-hour laboratory/demonstration period per week. Prerequisite, MATH 140, or 111 and 220. Primarily for students who major in psychology. A systematic survey of the content, models, and methodologies of sensory and perceptual research. A student who has completed PSYC 310 must have permission of the instructor in order to register for PSYC 410.

PSYC 412 Experimental Psychology — Sensory Processes II. (4) Two lectures and four hours of laboratory exercise and research per week. Prerequisite, PSYC 410 or consent of instructor. Primarily for psychology majors and majors in biological sciences with a special interest in sensory processes. Lectures and laboratory exercises will emphasize contemporary problems in sensory process research. Sufficient latitude will be provided so the exceptional student may conduct original research based on findings reported in the current literature.

PSYC 420 Experimental Psychology — Social Processes. (4) Prerequisite, PSYC 200 and 221. Primarily for psychology majors. A laboratory course which provides a basic understanding of experimental method in social psychology and experience in conducting research on social processes.

PSYC 422 Language and Social Communication. (3) Prerequisite, PSYC 420. The nature and significance of verbal and nonverbal communication in social psychological processes including examination of relevant theoretical approaches to symbolic behavior.

PSYC 423 Advanced Social Psychology. (3) Prerequisite, PSYC 420. A systematic review of research and points of view in regard to major problems in the field of social psychology.

PSYC 431 Abnormal Psychology. (3) Prerequisite, PSYC 100, 200, and 400 or 410 or 420. The nature, diagnosis, etiology, and treatment of mental disorders. A student may not receive credit for both PSYC 331 and 431.

PSYC 433 Advanced Topics in Child Psychology. (3) Prerequisite, PSYC 200, 335. The growth and transformation of basic psychological processes from birth to maturity. Emphasis is on research data and methodological issues, especially as they relate to other aspects of psychology. A student may not receive credit for both PSYC 333 and 433.

PSYC 435 Personality. (3) Prerequisite, PSYC 200, 331, and 400 or 410 or 420. Major personality theories, their postulates and evidence, assessment and research methodology in personality, major areas of personality research, their methodologies, findings, implications, and relationships to the field of psychology. A student may not receive credit for both PSYC 335 and 435.

PSYC 436 Introduction to Clinical Psychology. (3) Prerequisites, PSYC 451; either PSYC 431 or 435; and either PSYC 400 or 410 or 420. A survey and critical analysis of clinical psychology, with particular emphasis on current developments and trends. Designed to broaden the student's perspective on clinical psychology, to increase his intrinsic interest in the field, and to provide him with a firmer basis for critical evaluation of major theoretical and methodological foundations in the field. Students will be expected to conduct individual projects related to the course with a substantial amount of direct supervision.

PSYC 440 Introduction to Cognitive Psychology. (3) Prerequisite, PSYC 200. This course serves as an introduction to selected topics and theories in cognitive psychology. Topics include visual and auditory information processing, attention, memory, concept identification and psycholinguistics.

PSYC 441 Psychology of Human Learning. (3) Prerequisite, PSYC 200 and 440 or 410 or 420. Review and analysis of the major phenomena and theories of human learning, including an introduction to the fields of problem solving, thinking and reasoning.

PSYC 451 Principles of Psychological Testing. (4) Three lectures and one two-hour laboratory period per week. Prerequisite, PSYC 200 or the equivalent. A survey of the basic concepts and theories of psychological measurement illustrated through demonstration of principal approaches to psychological testing.

PSYC 452 Psychology of Individual Differences. (3) Prerequisite, PSYC 200. Problems theories and researches related to psychological differences among individuals and groups.

PSYC 453 Mathematical Psychology. (3) Prerequisite, PSYC 200 or the equivalent, and consent of instructor. A survey of mathematical formulations in psychology, including measurement and scaling models, statistical and psychometric models, and elementary mathematical representations of psychological processes in learning, choice, psychophysics, and social behavior.

PSYC 461 Personnel and Organizational Psychology. (3) Prerequisite, PSYC 200 or the equivalent, and one other 200 level course. For majors. Intensive examination of issues in personnel psychology (recruitment, selection and classification, job satisfaction) and organizational psychology (motivation, morale, group processes including leadership, organization theory). Emphasis is on theories of behavior in organizations and research results regarding behavior in on-going human systems. Where appropriate, relations between theory and practice are discussed.

PSYC 462 Engineering Psychology and Training Models. (3) Prerequisite, PSYC 200 or the equivalent, and one other 200 level course. For majors. An examination of the theories and research regarding human performance capabilities and skills (information processing, decision-making, environmental constraints, automation), training procedures (traditional methods, programmed learning, computer-assisted instruction) and models and procedures for evaluating training programs in industry, education, and service organizations.

PSYC 467 Vocational Psychology. (3) Survey and critical analysis of theory and research on vocational choice and vocational adjustment. Definition and correlates of vocational aspirations, preferences, choices, motivation, success, and satisfaction. Developmental trends in career decision-making and career patterns.

PSYC 478 Independent Study in Psychology. (1-3) Prerequisite, written consent of instructor. A student who wishes to take independent research study must have completed 12 hours of psychology with at least a 2.5 average. Integrated reading under direction leading to the preparation of an adequately documented report on a special topic. (In special cases a student who may need to repeat this course in order to complete his independent study will make a formal request, including a research proposal, through his advisor to the departmental honors committee.)

PSYC 479 Special Research Problems in Psychology. (1-3) Prerequisite, written consent of instructor. A student who wishes to take independent research study must have completed 12 hours of psychology with at least a 2.5 average. An individual course designed to allow the student to pursue a specialized research topic under supervision. (In special cases a student who may need to repeat this course in order to complete his research will make a formal request, including a research proposal, through his advisor to the departmental honors committee.)

PSYC 488 Advanced Psychology I (Honors). (3) H — Honors. Usually taken during junior year. Prerequisites, PSYC 200 and permission of department honors committee. Seminar covering topics in sensation, perception, learning, and motivation.

PSYC 489 Senior Seminar. (3)

PSYC 498 Advanced Psychology II (Honors). (3) H — Honors. Usually taken during senior year. Prerequisite, PSYC 488H. Semester covering topics in measurement, social processes and other subject matter of current interest.

PSYC 499 Honors Thesis Research. (3) H — Honors. Usually taken during last semester in residence. Prerequisite, permission of thesis advisor.

Recreation

RECR 130 History and Introduction to Recreation. (2) An introduction to the beginnings, growth, and possibilities in recreation as presently conducted by individuals, agencies and governments; attitudes toward and theories of play; historical events and figures; organizations and groups interested in recreation, including their job opportunities, specifications and demands; a self analysis of individual student interests, limitations and capabilities in light of these specifications and demands.

RECR 150 Camp Counseling. (2) A study of the philosophy and techniques of camp counseling including the qualifications, responsibilities and skills involved; the basic organization, administration and program planning practices and problems of camping as a whole; the relationship of these practices and problems to the counselor and his or her probable success. Outdoor skills will be taught and practiced insofar as possible with field trips included.

RECR 220 Co-Recreational Games and Programs. (2) Compilation and sampling of the techniques for use in low organization and party games and activities. Emphasis is placed upon those activities of value to a recreation leader or teacher, and upon the placement, sequence and variation of such activities for all age levels and interests.

RECR 221 Nature Lore. (2) An overall orientation course in nature interpretation covering, from a recreational point of view, the various areas of the physical and biological sciences. Students will be required to attend

evening classes, carry out various observations, and participate in practice-leadership experiences as scheduled.

RECR 325 General Fundamentals of Recreation. (3) This course is designed for and limited to students not majoring in recreation who wish to develop some understanding of the place, importance and potentialities of recreation in modern life. Included will be limited study of the areas of philosophy, program planning, leadership techniques, organization and administration, and interrelationships with other fields.

RECR 349 Observation and Field Work in Recreation. (8) Limited to recreation majors. Appropriate observation and field work placement will be selected and assigned on the basis of the student's interest and future employment plans. The field work experience itself will be expected to provide, (1) face to face leadership activity, (2) participation in staff activities and responsibilities as feasible — filing, making of reports, etc., and exposure to any and all intra and inter agency of department relationships and activities — budget hearings, training sessions, board meetings, etc.

RECR 375 Introduction to Therapeutic Recreation. (3) A study of the nature of physical and emotional deficiency and illness, the effect upon them of various recreation skills, activities and programs, and the methods recommended for the latter's implementation.

RECR 415 Quantitative Methods. (3) A course covering the statistical techniques most frequently used in research pertaining to recreation. An effort will be made to provide the student with the necessary skills, and to acquaint him with the interpretations and practical applications of these techniques.

RECR 420 Program Planning. (3) Prerequisite, RECR 130 or 325. Study of the various aspects, problems and practices of agency, military, 'exceptional,' and governmental recreation programs and their planning (with particular emphasis on playground, community and teen center plans and procedures). Observations will be required.

RECR 426 Industrial Employee Recreation. (3) An introductory study of the philosophy of and practices and problems in industrial recreation. Where possible the course will include opportunities for observation and for meeting visiting specialists.

RECR 432 Philosophy of Recreation. (3) A study of the meanings, relationships, and services of recreation as expressed by past and present authorities and leaders. This course should be of interest to people active in education, social work, and related fields.

RECR 450 Camp Management. (3) Prerequisite, RECR 150 or experience. An advanced camping course for those students with previous training and experience; organization, administration, programming, current trends, evaluation, and special problems. Whenever possible, visiting specialists and field trips will be included.

RECR 454 Outdoor Education. (6) Field experience and resident camping in an outdoor setting will be used to present the activities and techniques recommended for modern outdoor education practice. Where possible groups of participants will be utilized as subjects for practice instructional work. Activity will emphasize not only the subject matter of science and education but also the broad concepts of conservation, worthy use of leisure time, education for democratic living, etc.

RECR 460 Leadership Techniques and Practices. (3) Prerequisite, RECR 130 or 325. A study of the various kinds and levels of leadership exerted by professional and volunteer workers, some of the difficulties and probable weaknesses to be met, and some of the tangible techniques to be used with personnel, staff and public relationships. The group work approach will be emphasized and used, insofar as possible, in the solution of particular problems that grow out of required field experiences in handling on or off campus groups.

RECR 463 Supervisory Techniques in Recreation. (3) A study of the principles, methods, techniques as well as an analysis of of the functions of supervision in the recreation and parks environment. This course is designed to advance the student's understanding of the art of building human relationships, and to apply the emerging concepts and principles of modern supervision to practical situations in which administrators, supervisors, leaders (both professional and paraprofessional) and volunteers are working.

RECR 476 Institutional Recreation. (3) An introductory study of the philosophy of and practices in hospital and institutional recreation. Where possible the course will include opportunities for observation and for meeting visiting specialists.

RECR 489 Field Laboratory Projects and Workshop. (1-6) A course designed to meet the needs of persons in the field with respect to workshops and research projects in special areas of knowledge not covered by regularly structured courses.

RECR 490 Organization and Administration of Recreation. (3) A study of the organizational patterns and administrative problems involved in the various types of operating recreation departments and agencies; forms of organization; finance and budget; personnel; public relations.

RECR 495 Planning, Design and Maintenance of Park and Recreation Areas and Facilities. (3) Studies the relation of the park and recreation system to the total community planning process; area layout, design and maintenance of facilities. Field experience will include the conduct of community surveys and preparation of site plans as requested by community groups. The development of such studies will include inspection of areas, site analysis, preparation of plans, and their presentation to the community where possible.

Agricultural and Extension Education

RLED 302 Introduction to Agricultural Education. (2) An overview of the job of the teacher of agriculture; examination of agricultural education programs for youth and adults.

RLED 303 Teaching Materials and Demonstrations. (2) Principles and practices of the demonstration method; construction and use of visual aids in teaching agriculture.

RLED 305 Teaching Young and Adult Farmer Groups. (1) Characteristics of young and adult farmer instruction in agriculture. Determining needs for and organizing a course; selecting materials for instruction; and class management. Emphasis is on the conference method of teaching.

RLED 311 Teaching Secondary Vocational Agriculture. (3) A comprehensive course in the work of high school departments of vocational agriculture. It emphasizes particularly placement, supervised farming programs, the organization and administration of future farmer activities, and objectives and methods in all-day instruction.

RLED 313 Student Teaching. (5) Prerequisite, satisfactory academic average and permission of instructor. Full-time student teaching in an off-campus student teaching center under an approved supervising teacher of agriculture, participating experience in all aspects of the work of a teacher of agriculture.

RLED 315 Student Teaching. (1-4) Prerequisite, satisfactory academic average and permission of instructor. Full-time observation and participation in work of teacher of agriculture in off-campus student teaching center. Provides students opportunity to gain experience in the summer program of work, to participate in opening of school activities, and to gain other experience needed by teachers.

RLED 323 Developing Youth Programs. (3) A study of concepts involved in planning and executing programs developed to meet the needs of youth especially those living in rural and suburban areas. Emphasis will be placed on the identification of attitudes, needs, and problems of youth in all socio-economic levels. An analysis of methods or working with youth groups and developing volunteer leaders will also be included.

RLED 325 Directed Experience in Extension Education. (1-5) Prerequisite, Satisfactory academic average and permission of instructor. Full-time observation and participation in selected aspects of extension education in an approved training county.

RLED 327 Program Planning in Extension. (3) Studies concepts involved in planning, execution and evaluation of educational programs. Students will apply the concepts while assisting with the planning and evaluation of programs. Special emphasis will also be given to extension education.

RLED 398 Seminar in Agricultural Education. (1) Examination of current literature, reports and discussions of problems, trends, and issues in agricultural education.

RLED 422 Extension Education. (3) The agricultural extension service as an educational agency. The history, philosophy, objectives, policy, organization, legislation and methods used in extension work.

RLED 423 Extension Communications. (3) An introduction to communications in teaching and within an organization, including barriers to communication, the diffusion process and the application of communication principles person to person, with groups and through mass media.

RLED 426 Development and Management of Extension Youth Programs. (3) Designed for present and prospective state leaders of extension youth programs. Program development, principles of program management, leadership development and counseling; science, career selection and citizenship in youth programs, field experience in working with low income families' youth, urban work.

RLED 427 Group Dynamics in Continuing and Extension Education. (3) Concepts involved in working with groups planning extension and

continuing education programs. Analysis of group behavior and group dynamics related to small groups and development of a competence in the selection of appropriate methods and techniques.

RLED 464 Rural Life in Modern Society. (3) Examination of the many aspects of rural life that affect and are affected by changes in technical, natural and human resources. Emphasis is placed on the role which diverse organizations, agencies and institutions play in the education and adjustment of rural people to the demands of modern society.

RLED 466 Rural Poverty in an Affluent Society. (3) Topics examined include conditions under which people in poverty exist, factors giving rise to such conditions, problems faced by the rural poor, and the kinds of assistance they need to rise out of poverty. Topics and issues are examined in the context of rural-urban interrelationships and their effects on rural poverty. Special attention is given to past and present programs designed to alleviate poverty and to considerations and recommendations for future action.

RLED 487 Conservation of Natural Resources. (3) Designed primarily for teachers. Study of state's natural resources — soil, water, fisheries, wildlife, forests, and minerals — natural resources problems and practices. Extensive field study. Concentration on subject matter. Taken concurrently with RLED 497 in summer season.

RLED 488 Critique in Rural Education. (1) Current problems and trends in rural education.

RLED 489 Critique in Rural Education. (1) Current problems and trends in rural education.

RLED 497 Conservation of Natural Resources. (3) Designed primarily for teachers. Study of state's natural resources — soil, water, fisheries, wildlife, forests, and minerals — natural resources problems and practices. Extensive field study. Methods of teaching conservation included. Taken concurrently with RLED 487 in summer season.

RLED 499 Special Problems. (1-3) Prerequisite, staff approval.

Religious Studies

RLST 125 Introduction to Religion. (3) An introduction to Judaism, Christianity, and the religions of Asia, consideration of modern theories of religion including critics (e.g. Freud, Marx) and reinterpretation (e.g. Tillich, Bonhoeffer), some attention to recent religious movements in the west such as yoga, Pentecostalism, Zen, and the Jesus Movement.

RLST 200 Modern Religious Thought. (3) Major modern religious thinkers and intellectual movements in Europe and America from 1900 to the present. Study of Protestant, Catholic and Jewish writings, representing liberalism and modernism, fundamentalism, neoorthodoxy, Vatican II, and the 'Death of God' theology. Readings include Tillich, Barth, Neibuhr, Bonhoeffer, Buber, Heschel, Rubenstein, and Teilhard.

RLST 233 History of Jewish Thought I. (3) An exploration of the development of classical and rabbinic Jewish covenantal prophecy, apocalyptic development of legalism in Hebrew scriptures, early mysticism, covenantal demands in rabbinical thought, pietist attitudes and philosophy in the Middle Ages. Social factors and their intellectual repercussions — for example, Karaites and the Crusades.

RLST 234 History of Jewish Thought II. (3) The impact of historical events on Jewish thought from the 1492 Spanish expulsion to the present — false messianism, emancipation, Hasidism, varieties of orthodoxy and reforms since development in America.

Radio, Television and Film

RTVF 124 Mass Communication in 20th Century Society. (3) A problem centered approach to the study of mass communication and the impact of media on contemporary society. Each semester the media treatment of a contemporary social, economic or environmental issue is used as a focus for study of the principles, techniques and effects of mass media. Students produce simple radio, television and film material on the selected issue.

RTVF 222 Introduction to Radio and Television. (3) A survey of the development, scope and influence of radio and television in America, with emphasis on the relationship of the industry to the audience, the advertiser, and the government.

RTVF 223 The Television Program: Planning and Management. (3) Prerequisite, RTVF 222. Study of basic program formats and variations with special emphasis on pre-production planning, production organization, management, facility utilization and cost analysis.

RTVF Upper-level Course Prerequisites: RTVF 222 and RTVF 223 are prerequisites for all majors prior to enrollment in upper-level courses. Non-majors are required to obtain instructor's consent for all upper-level courses. All students are limited to one production course per semester unless permission is obtained prior to registration.

RTVF 302 Radio Production. (3) A study of the multiple problems facing the producer, including scripting, casting, acoustic planning, recording, editing and coordination or personnel. Some emphasis is given to the use of audio in media other than radio.

RTVF 314 Introduction to the Film. (3) An elementary survey of the film as an art form. Included are: the medium of the cinema, a brief survey of its development, film genres, esthetics, criticism, and the current international scene. A series of significant American and foreign films are viewed.

RTVF 317 Radio and Television Continuity Writing. (3) Prerequisite, consent of instructor. A study of the principles, methods and limitations of writing for radio and television. Application will be made in the writing of general types of continuities and commercials.

RTVF 332 Public Broadcasting. (3) Public television and radio: development; problems; influence; its place in contemporary broadcasting, through the viewing of and listening to selected programs.

RTVF 340 Principles of Television Production. (3) A study of the theory, methods, techniques and problems of television production. Units of study covering the television camera and lenses, lighting theory and practices, audio, graphic arts, film basics and special effects are included. Practical application of production theory is provided in television studios.

RTVF 346 Television News and Public Affairs. (3) Prerequisite, RTVF 317 or JOUR 360. A survey of the development of broadcast journalism, current problems concerning radio and television news, and the development of the documentary. Observation of news operations at nearby television stations are provided. Production exercises in television news presentation, interviews and discussions are conducted in television studios.

RTVF 347 Analysis of Broadcasting Processes and Results. (3) Survey of the more common analytic approaches, methods, and results in field of radio and television.

RTVF 351 Broadcast Programming. (3) An introduction to the history, types, theories, and conventions of American radio and television programming.

RTVF 355 Film Production. (3) Prerequisite, consent of instructor. A study of the theoretical and practical aspects of 16MM film production. Through reading and practice, students are familiarized with basic cinematography, lighting, editing, pictorial composition, and film continuity as a communication arts medium.

RTVF 413 The History of the Film. (3) An advanced survey of the film as an art form. Cinema pre-history, actualities and the lumiere tradition, Melies, Griffith, and their contemporaries, the silent film (1920-29): Germany, Russia, and the U.S.A., screen comedy, the sound film (1926-present): American and foreign master directors, recent and current trends. Recommended prior to this course: RTVF 314.

RTVF 414 Contemporary American Cinema. (3) Prerequisite, RTVF 222. An analysis of the trends and major social issues in American culture as they are expressed through the film medium. Emphasis on 'New Wave', experimental, underground, independent, and cinema verite motion pictures.

RTVF 415 Contemporary European Cinema. (3) A comparative and critical analysis of the European motion picture both as a distinct art form reflecting the national character of a particular country and as a medium for mass communications demonstrating the universality of the human condition.

RTVF 417 Dramatic Writing for Broadcasting and Film. (3) Prerequisite, RTVF 317 or consent of instructor. An introduction to the principles, methods and limitations of writing comedy, drama, and the documentary for radio, television, and film.

RTVF 418 The Film Auteur. (3) The intensive chronological study of the work of one European or American film director each semester.

RTVF 419 Film Genres. (3) The study of one major film genre each semester (the gangster film, the western, science fiction and horror, the political film). Cinema develops formal and thematic conventions and how, as a medium for reflecting social ideals and needs. Repeatable to a maximum of six credits.

RTVF 420 The Documentary Film. (3) Growth, implication, and the use of the international non-fiction film as propaganda, public service, promotion, education, and entertainment. Case studies from representative documentaries will be analyzed.

RTVF 421 Film Criticism and Theory. (3) Critical-aesthetic approaches to film in order to develop a vocabulary for film analysis. Included will be shot analysis; montage and deep focus; the Auteur theory; the role of screenwriter, director of photography, actor; genre analysis, analysis of film as popular art.

RTVF 425 Television and Politics. (3) Critical review of studies of the effects of political

broadcasts; legal and social issues; surveys and media campaigns.

RTVF 440 Television Direction. (3) Two hour lecture, two hour laboratory. Prerequisite, RTVF 340. Principles of television direction, including analysis of script, casting, rehearsing, production, audio and video control.

RTVF 449 Television Workshop. (3) Two-hour lecture, four-hour laboratory. Prerequisites, RTVF 340, 440 and consent of instructor.

RTVF 450 Radio and Television Station Management. (3). The role of the manager in the modern broadcasting industry. Station communication factors, regulation, licensing, personnel functions, sales, programming supervision, audience analysis, and station promotion.

RTVF 451 Broadcast Criticism. (3) An analysis of the professional, historical, social, and psychological criticism of American radio and television, together with practical application of professional and scholarly critical methods.

RTVF 452 International and Comparative Broadcasting Systems. (3) A comparative study of international broadcasting program policies, economic systems, control and organization. The use of broadcasting in international affairs as an instrument of propaganda, culture and information dissemination. Monitoring of overseas broadcasts, television programs and discussions with representatives of domestic and foreign international broadcast agencies.

RTVF 453 Broadcasting and Government. (3) Legal issues involving radio and television: freedom, restraints, self-regulation; regulation of programming, competition, rights as seen by the broadcaster, regulatory agencies and the public.

RTVF 465 Advanced Film Production. (3) Prerequisite, RTVF 355 and consent of instructor. Consideration of film technique and theory as they apply to the making of a full length motion picture.

RTVF 498 Seminar. (3) Prerequisites, senior standing and consent of instructor. Present day radio-television-film research. Repeatable to a maximum of six credits.

Russian

RUSS 111 Elementary Russian. (3) Three recitations and one laboratory hour per week. Elements of grammar, pronunciation and conversation; exercises in translation.

RUSS 112 Elementary Russian. (3) Three recitations and one laboratory hour per week. Elements of grammar, pronunciation and conversation; exercises in translation.

RUSS 114 Intermediate Russian. (3) Three recitations per week. Additional laboratory. Prerequisite, RUSS 112 or equivalent. Reading of texts designed to give some knowledge of Russian life, thought and culture.

RUSS 115 Intermediate Russian. (3) Three recitations per week, additional laboratory. Prerequisite, RUSS 114 or equivalent. Reading of text designed to give some knowledge of Russian life, thought and culture.

S — Scientific. Prerequisite, RUSS 114 or equivalent. Reading of technical and scientific prose.

RUSS 121 Intensive Elementary Russian. (6) Introduction to speaking, reading, and writing Russian with emphasis on mastering the essentials of basic structural patterns and pronunciation. Eight hours per week.

RUSS 122 Intensive Intermediate Russian. (6) Prerequisite, RUSS 112, 121 or equivalent. Eight hours per week, including two drill hours. Reading of texts designed to give some knowledge of Russian life, thought, and culture.

RUSS 201 Conversation and Composition. (3) Prerequisite, RUSS 115 or equivalent. A practical language course recommended for all students continuing in Russian.

RUSS 202 Conversation and Composition. (3) Prerequisite, RUSS 115 or equivalent. A practical language course recommended for all students continuing in Russian.

RUSS 301 Review Grammar and Composition. (3) Prerequisite, RUSS 115 or equivalent. Designed to give a thorough training in the structure of the language; drill in Russian composition.

RUSS 302 Review Grammar and Composition. (3) Prerequisite, RUSS 115 or equivalent. Designed to give a thorough training in the structure of the language; drill in Russian composition.

RUSS 311 Advanced Conversation. (3) Prerequisite, RUSS 201, 202 or consent of instructor. For students who wish to develop fluency and confidence in speaking the language.

RUSS 312 Advanced Conversation. (3) Prerequisite, RUSS 201, 202 or consent of instructor. For students who wish to develop fluency and confidence in speaking the language.

RUSS 321 Survey of Russian Literature. (3) Prerequisite, RUSS 115 or equivalent. An elementary survey of Russian literature.

RUSS 322 Survey of Russian Literature. (3) Prerequisite, RUSS 115 or equivalent. An elementary survey of Russian literature.

RUSS 365 Slavic Literature in Translation. (3) A survey of the major works of the literatures of the south, west, and east Slavs (Yugoslav and Bulgarian, Polish and Czech, Russian primarily) on a comparative basis.

RUSS 397 Honors Seminar. (3) H — Honors. Prerequisite, permission of honors committee chairman. Discussion of a central theme with related investigations by students. Conducted in Russian.

RUSS 398 Honors Reading Course. (3) H — Honors. Prerequisite, RUSS 321 and 322, or permission of instructor, or honors committee chairman. Supervised reading and independent study taken normally by students admitted into the honors program. Conducted in Russian. Repeatable to a maximum of 9 credits.

RUSS 399 Directed Study in Russian. (1-3) For advanced students, by permission of department chairman. Course may be repeated for credit if content differs to a maximum of six hours.

RUSS 401 Advanced Composition. (3)

RUSS 402 Advanced Composition. (3)

RUSS 421 Russian Civilization (in Russian) I. (3) An historical survey of Russian civilization, emphasizing architecture, painting, sculpture, music, ballet and the theater to the beginning of the 19th century pointing out the inter-relationship of all with literary movements. Taught in Russian.

RUSS 422 Russian Civilization (in Russian) II. (3) An historical survey of Russian civilization emphasizing architecture, painting, sculpture, music, ballet, and the theater from the beginning of the 19th century to the present pointing out the inter-relationships of all with literary movements. Taught in Russian.

RUSS 441 Russian Literature of the Eighteenth Century. (3)

RUSS 451 Russian Literature of the Nineteenth Century. (3)

RUSS 452 Russian Literature of the Nineteenth Century. (3)

RUSS 461 Soviet Russian Literature. (3)

RUSS 462 Soviet Russian Literature. (3)

RUSS 465 Modern Russian Poetry. (3)

RUSS 466 Modern Russian Drama. (3)

RUSS 467 Modern Russian Fiction. (3)

RUSS 468 19th Century Russian Literature in Translation. (3) Development of Russian literary thought in the Russian novel and short prose of the 19th century. Influence of western literatures and philosophies considered. Repeatable to a maximum of six credits when content differs.

RUSS 470 Applied Linguistics. (3) The nature of applied linguistics and its contributions to the effective teaching of foreign languages. Comparative study of English and Russian, with emphasis upon points of divergence. Analysis, evaluation and construction of related drills.

RUSS 471 Comparative Slavic Linguistics. (3) Comparative Slavic linguistics and, especially, a concept of the place of the Russian language in the world of Slavic culture through the reading of selected texts illustrating common Slavic relationships and dissimilarities.

RUSS 478 Soviet Literature in Translation. (3) Russian literature since 1917, both as a continuation of prerevolutionary traditions and as a reflection of Soviet ideology. Repeatable to a maximum of six credits when content differs.

Sociology

SOCY 100 Introduction to Sociology. (3) The fundamental concepts and principles of sociology. Includes consideration of culture, patterns of social interaction, norms, values, social institutions, stratification, and social change.

SOCY 105 Introduction to Contemporary Social Problems. (3) An examination of contemporary social problems through sociological perspectives; ways in which social problems are part of the organization of society; a detailed study of selected social problems including social conflict and social inequality. Not open to students who already have credit for SOCY 210.

SOCY 110 Rural Sociology. (3) Prerequisite, SOCY 100 or 105. Rural life in America: its people, social organization, culture patterns, and problems.

SOCY 120 Urban Sociology. (3) Prerequisite, SOCY 100 or 105. Urban growth and expansion: characteristics of city populations; urban institutions and personality patterns; relations of city and country.

SOCY 201 Introductory Statistics for Sociology. (3) Two lectures and two hours drill per week. Prerequisites, SOCY 100 or 105 and MATH 110 or equivalent. Elementary descriptive and inferential statistics. Measures

of central tendency and variation, non-parametric and parametric measures of association and correlation, one-way analysis of variance, hypothesis testing, point and interval estimates. Required of all sociology majors.

SOCY 202 Introduction to Research Methods in Sociology. (3) Prerequisite, SOCY 100 or 105 and 201. Nature and scope of sociological research problem formulation, case study methods, observational methods, survey method, experimental methods, documentary methods, miscellaneous methods. Required of all sociology majors.

SOCY 203 Sociological Theory. (3) Prerequisite, SOCY 100 or 105. Development of the science of sociology; historical backgrounds; recent theories of society. Required of all sociology majors.

SOCY 215 Social Institutions. (3) Prerequisites, SOCY 100 or 105. Nature and function of social institutions; the perpetuation of behavior through customs and social norms; typical contemporary American institutions.

SOCY 230 Dynamics of Social Interaction. (3) Prerequisite, SOCY 100 or 105. Social psychology of groups such as committees, teams, clubs, sects, social movements, crowds and publics. Origin of the social self; role behavior, inter-group and intra-group relations.

SOCY 310 Introduction to Social Welfare. (3) Prerequisite, SOCY 100 or 105. General survey of the field of social welfare activities; historical development; growth, functions and specialization of agencies and services, private and public.

SOCY 311 Senior Seminar in Social Work. (3) Prerequisite, SOCY 100 or 105 and permission of the instructor. Experience in applying social science theory to concrete social problems. Cases of psychological, social and biological malfunction will be studied, and specific treatment plans constructed. The interrelated nature of several causes of deviant behavior will be stressed, as will the importance of understanding and using the principles of several social science disciplines.

SOCY 325 Sex Roles. (3) Prerequisite, SOCY 100 or 105. Implications of the sociological perspective of sex differences in contemporary western society. Sexual inequality as an aspect of social stratification, cultural views of sex differences, sex-role socialization, and sex-role change.

SOCY 330 Community Organization. (3) Prerequisite, SOCY 100 or 105. Community organization and its relation to social welfare; analysis of community needs and resources; health, housing, recreation; community centers; neighborhood projects.

SOCY 359 Social Field Training. (1-3) Prerequisites, permission of instructor and at least 12 hours of sociology credit. Enrollment restricted to available placements. The student will be responsible to an agency for a program of in-service training. Group meetings, individual conferences and written program reports will be a required part of the course.

SOCY 388 Independent Research in Sociology. (3) H — Honors. Prerequisite, SOCY 100 or 105 and consent of instructor. For honors students only. This course is designed for the needs of the honors students in sociology.

SOCY 389 Independent Reading Course in Sociology. (3) Prerequisite, SOCY 100 or 105 and consent of instructor. For honors students only. This course is designed for the needs of the honors students in sociology.

SOCY 399 Independent Study in Sociology. (1-6) Prerequisites, written consent of faculty under whose direction the study is to be performed, and at least 12 hours of sociology credit to include one or more of the following: SOCY 201; 202; 203. Integrated reading or research under direction and supervision of faculty member.

SOCY 401 Intermediate Statistics for Sociologists. (3) Prerequisites, SOCY 201 or equivalent and six additional credits in sociology. Intermediate correlation techniques, analysis of variance, sampling, additional non-parametric techniques, additional topics in inferential statistics. Required of all candidates for the M.A. degree.

SOCY 410 Population I. (3) Prerequisite, junior standing; SOCY 100 or 105 not required. Population distribution and growth; sources of demographic data; population composition; population theories; mortality; fertility and family planning; migration; and population problems and policy.

SOCY 411 Population II. (3) Prerequisite, SOCY 410 and 201 or equivalent statistical training. Application of statistical techniques employed in the analysis of census and vital statistics data, including methods of population standardization, life table construction, and use of computerized demographic data.

SOCY 421 Intercultural Sociology. (3) Prerequisite, SOCY 100 or 105. On the basis of a comparative study of customs, individual and group behavior patterns and institutions. This course studies the ideologies of America and other modern societies.

SOCY 423 Ethnic Minorities. (3) Prerequisite, SOCY 100 or 105. Basic social processes in the relations of ethnic groups; immigration groups and the Negro in the United States; ethnic minorities in Europe.

SOCY 424 Sociology of Race Relations. (3) Prerequisite, SOCY 100 or 105. Race as a focus of social relations. Political and collective action centering on race relations. New myths of race. Trends in assimilation of racial groupings.

SOCY 425 Sex Roles and Social Institutions. (3) Prerequisite, 12 credits in sociology. Relationship between sex roles and the structure of one or more social institutions (e.g., the economy, the family, the political system, religion, education). The issues of major concern are: how assumptions about sex roles are built into social institutions; how social institutions serve to perpetuate or transform sex roles; how changing sex roles affect social institutions.

SOCY 426 Sociology of Religion. (3) Prerequisite, SOCY 100 or 105. Varieties and sources of religious experience. Religious institutions and the role of religion in social life.

SOCY 427 Deviant Behavior. (3) Prerequisite, SOCY 100 or 105. Current theories of the genesis and distribution of deviant behavior. Definitions of deviance, labeling theory, secondary deviance. Theories of specific forms of deviant behavior will be examined for their implications for a general theory of deviant behavior.

SOCY 430 Sociology of Personality. (3) Prerequisite, SOCY 100 or 105. Development of human nature and personality in contemporary social life; processes of socialization; attitudes, individual differences and social behavior.

SOCY 431 Formal and Complex Organizations. (3) Prerequisite, SOCY 100 or 105. The concept of formal organization. The study of functioning and control in the operation of bureaucracies such as corporations and in large-scale organizations such as military, religious and educational hierarchies. Forms of recruitment, internal mobility and organizational personality. Relations between large-scale organizations and with the larger society.

SOCY 432 Collective Behavior. (3) Prerequisite, SOCY 100 or 105. Social interaction in mass behavior: communication processes; structure and functioning of crowds, strikes, audiences, mass movements, and the public.

SOCY 433 Social Control. (3) Prerequisite, SOCY 100 or 105 or 200. Forms, mechanism, and techniques of group influence on human behavior; problems of social control in contemporary society.

SOCY 441 Social Stratification. (3) Prerequisite, 9 credits of sociology. An introduction to the sociology of social stratification. Consideration of the basic concepts and major findings in the field. The relationship of social stratification to the institutional orders of the society.

SOCY 443 The Family and Society. (3) Prerequisite, SOCY 100 or 105. Study of the family as a social institution; its biological and cultural foundation; historic development, changing structure, and function; the interaction of marriage and parenthood, disorganizing and reorganizing factors in present day trends.

SOCY 445 Sociology of the Arts. (3) Prerequisite, SOCY 100 or 105. Functions of the arts as a social institution. Social role of the artist. Recruitment to and organizational structure of artistic professions. Art forms and social characteristics of audiences. Changing technology and social values as reflected in artistic expression.

SOCY 447 Small Group Analysis. (3) Prerequisites, SOCY 100 or 105 and 201 (sociological statistics) or equivalent. Analysis of small group structures and dynamics. Review of research on small groups in real life settings and in laboratories. Presentation of techniques used in small groups.

SOCY 457 Sociology of Law. (3) Prerequisite, SOCY 100 or 105. Law as a form of social control: interrelation between legal and other conduct norms as to their content, sanctions, and methods of securing conformity; law as an integral part of the culture of groups; factors and processes operative in the formation of legal norms as determinants of human behavior.

SOCY 460 Sociology of Occupations and Careers. (3) Prerequisite, SOCY 100 or 105. The sociology of work and occupational life in modern society. Changing occupational ideologies, values and choices. Occupational status systems and occupational mobility. The social psychology of career success.

SOCY 462 Industrial Sociology. (3) Prerequisite, SOCY 100 or 105. The sociology of human relations in American industry and business. Complex industrial and business organization as social systems. Social relationships within and between industry, business, community, and society.

SOCY 464 Military Sociology. (3) Prerequisite, SOCY 100 or 105. Social change and the growth of military institutions. Complex formal military organizations. Military service as an occupation or profession. The sociology of military life. Relations between military institutions, civilian communities and society.

SOCY 465 The Sociology of War. (3) Prerequisite, SOCY 100 or 105. The origin and development of armed forces as institutions, the social causes, operations and results of war as social conflict; the relations of peace and war and revolution in contemporary civilizations.

SOCY 466 Sociology of Politics. (3) Prerequisite, 9 credits in sociology. An introduction to the sociology of political phenomena. Consideration of the basic concepts and major findings in the field; the relationship of the polity to other institutional orders of the society; the relationship of political activity in America to the theory of democracy.

SOCY 467 Sociology of Education. (3) Prerequisites, SOCY 100 or 105 or permission of the instructor. Listed also as EDSF 430. Sociological analysis of educational institutions and their relation to society: goals and functions, the mechanisms of social control, and the impacts of stratification and social change. Study of the school as a formal organization, and the roles and subcultures of teachers and students.

SOCY 470 Rural-Urban Relations. (3) Prerequisite, SOCY 100 or 105. The ecology of population and the forces making for change in rural and urban life; migration, decentralization and regionalism as methods of studying individual and national issues. Applied field problems.

SOCY 471 The Rural Community. (3) Prerequisite, SOCY 100 or 105. A detailed study of rural life with emphasis on levels of living, the family, school, and church and organizational activities in the fields of health, recreation, welfare, and planning.

SOCY 473 The City. (3) Prerequisite,SOCY 100 or 105. The rise of urban civilization and metropolitan regions; ecological process and structure; the city as a center of dominance; social problems, control and planning.

SOCY 498 Selected Topics in Sociology. (3) Prerequisite, SOCY 100 or 105. Topics of special interest to advanced undergraduates in sociology. Such courses will be offered in response to student request and faculty interest. No more than 6 credits may be taken by a student in selected topics.

Spanish

SPAN 101 Elementary Spanish. (4) Introduction to basic structures, with emphasis upon understanding and speaking. Four recitations per week, and one optional laboratory hour. Normally leads to 102, but gifted students may be recommended for 102H.

SPAN 102 Elementary Spanish. (4) Completion of basic structures, with increasing emphasis upon reading skill, reinforced by discussion and composition. Four recitations per week, and one optional laboratory hour. Normally leads to 104, but gifted students may be recommended for 104H.

H — Honors. Limited to students who have been recommended by their instructor in 101. Enriched course of study, with broad reading base and related development of oral and written expression. Four recitations per week and one optional laboratory hour. Normally leads to 201 or 221 at student's option.

SPAN 103 Review of Elementary Spanish. (4) An intensive beginning course in Spanish language skills: guided practice in reading and writing, understanding the spoken language and conversation, to enable the student to move more quickly to advanced courses. Enrollment restricted to students who have had at least two years of Spanish or the equivalent and who do not qualify for SPAN 104, and to students who already have a good background in at least one other language (successful completion of level 4 in high school or 115 or 104 or equivalent at the university level).

SPAN 104 Intermediate Spanish. (4) Continued development of the skills of understanding and speaking with supplementary attention to reading and writing. Four recitations per week, and one optional laboratory hour. Normally leads to 201 or 221, at student's option.

H — Honors. Limited to students who have been recommended by their instructor in 102. Enriched course of study, with broad oral base and related development of reading and writing. Four recitations per week and one optional laboratory hour. Normally leads to 321, 322, 323, or 324 at student's option.

SPAN 201 Review of Oral and Written Spanish. (3) Prerequisite, SPAN 104. A practical language course recommended for all students continuing in Spanish. May be taken concurrently with SPAN 221.

SPAN 202 Intermediate Conversation. (3) Prerequisite, SPAN 104 or permission of instructor. Provides an opportunity to develop fluency in oral Spanish.

SPAN 211 Spanish Phonetics. (3) Prerequisite, SPAN 104 or equivalent. Descriptive study of the Spanish sound system. Practice in phonetic perception, transcription and articulation. Particular attention to sentence phonetics; juncture, rhythm, stress, pitch.

SPAN 221 Readings in Spanish. (3) Prerequisite, SPAN 104. Selected readings from various genres in Spanish and Spanish American literature. Discussion and brief written reports in Spanish.

SPAN 301 Review Grammar and Composition. (3) Prerequisite,SPAN 201 or equivalent.. An intensive review of grammar and practice in Spanish composition.

SPAN 302 Review Grammar and Composition. (3) Prerequisite, SPAN 301 or equivalent.

SPAN 311 Advanced Conversation. (3) Prerequisite, SPAN 201 or consent of instructor. Designed to develop fluency and accuracy in speaking Spanish.

SPAN 312 Advanced Conversation. (3) Prerequisite, SPAN 201 or consent of instructor.

SPAN 315 Commercial Spanish. (3) Prerequisite, SPAN 302 or equivalent or consent of instructor. Designed to give a knowledge of correct commercial Spanish including letters and business forms.

SPAN 316 Practicum in Translation. (3) Prerequisite, SPAN 302. Pre-professional training in translating technical and literary Spanish.

SPAN 321 Survey of Spanish Literature. (3)

SPAN 322 Survey of Spanish Literature. (3)

SPAN 323 Survey of Spanish-American Literature. (3) Basic survey of the history of Spanish-American literature.

SPAN 324 Survey of Spanish-American Literature. (3) Basic survey of the history of Spanish-American literature.

SPAN 378 Pro-seminar in the Hispanic Literatures. (3) Prerequisite, SPAN 321-322 (for Spanish topic); SPAN 323-324 (for Spanish-American topic). May be repeated to a maximum of six credits, with change of topic.

SPAN 399 Independent Study in Spanish. (1-3) Prerequisite, permission of instructor. Specific readings in literature under the supervision of a faculty member of the department. Repeatable to a maximum of three credits.

SPAN 401 Advanced Composition. (3) Exercises in practical stylistics, with special emphasis on idiomatic and syntactic structures.

SPAN 402 Advanced Composition. (3) Exercises in practical stylistics, with special emphasis on idiomatic and syntactic structures.

SPAN 404 Oral Practice for Non-native Teachers of Spanish. (3) Prerequisite, consent of instructor. Development of fluency in Spanish with stress on correct sentence structure, pronunciation and idiomatic expression.

SPAN 408 Great Themes of the Hispanic Literatures. (3) Pervading themes in the literature of Spain or Spanish-America. Each theme will be announced when the course is offered.

SPAN 409 Great Themes of the Hispanic Literatures. (3) Pervading themes in the literature of Spain or Spanish-America. Each theme will be announced when the course is offered.

SPAN 410 Literature of the Middle Ages. (3) Spanish literary history from the eleventh through the fifteenth century. Reading of representative texts. This course covers until 1350.

SPAN 411 Literature of the Middle Ages. (3) Spanish literary history from the eleventh through the fifteenth century. Reading of representative texts. This course covers from 1350 to 1500.

SPAN 412 The Romancero. (3) Origin, nature and influence. Extensive reading in each of the respective sub-genres.

SPAN 418 Hispanic Literature in Translation. (3) May be repeated to a maximum of six credits, with change of topic.

SPAN 420 Poetry of the 16th Century. (3) Prerequisite, SPAN 321 or equivalent. Selected readings and literary analysis.

SPAN 421 Prose of the 16th Century. (3) Prerequisite, SPAN 321 or equivalent. Selected readings and literary analysis.

SPAN 424 Drama of the Sixteenth Century. (3) From the earliest autos and pasos, the development of Spanish drama anterior to Lope de Vega, including Cervantes.

SPAN 425 Spanish Civilization. (3) A survey of 2000 years of Spanish history, outlining the cultural heritage of the Spanish people, their great men, traditions, customs, art, and literature, with special emphasis on the interrelationship of social and literary history. Conducted in Spanish.

SPAN 426 Spanish Civilization. (3) A survey of 2000 years of Spanish history, outlining the cultural heritage of the Spanish people, their great men, traditions, customs, art, and literature, with special emphasis on the interrelationship of social and literary history. Conducted in Spanish.

SPAN 430 Cervantes-Don Quijote. (3) Prerequisite, SPAN 321 or equivalent..

SPAN 431 Cervantes — Novelas Ejemplares and Entremeses. (3) Prerequisite, SPAN 321 or equivalent.

SPAN 434 Poetry of the 17th Century. (3) Prerequisite, SPAN 321 or equivalent.. Selected readings, literary analysis, and discussion of the outstanding poetry of the period, in the light of the historical background.

SPAN 435 Prose of the 17th Century. (3) Prerequisite, SPAN 321 or equivalent. Selected readings, literary analysis, and discussion of the outstanding prose of the period, in the light of the historical background.

SPAN 436 Drama of the Seventeenth Century. (3) Devoted to Lope de Vega, dramatic theory and the Spanish stage.

SPAN 437 Drama of the Seventeenth Century. (3) Drama after Lope de Vega to Calderon de la Barca and the decline of the Spanish theater.

SPAN 440 Literature of the Eighteenth Century. (3) Traditionalism, neo-Classicism, and pre-Romanticism in prose, poetry, and the theater; esthetics and poetics of the Enlightenment.

SPAN 441 Literature of the Eighteenth Century. (3) Traditionalism, neo-Classicism, and pre-Romanticism in prose, poetry, and the theater: esthetics and poetics of the Enlightenment.

SPAN 446 Latin American Civilization I. (3) A survey of the cultural heritage of the Latin American peoples from the pre-Columbian period to independence. Hispanic and other European influences. Conducted in Spanish.

SPAN 447 Latin American Civilization II. (3). A survey of the cultural heritage of the Latin American peoples from independence to the present. Hispanic and other European influences. Conducted in Spanish.

SPAN 448 Special Topics in Latin American Civilization. (3) An intensive study of a selected topic related to Latin American civilization. This course may be taken no more than twice. Conducted in Spanish.

SPAN 449 Special Topics in Spanish Civilization. (3) An intensive study of a selected topic related to Spanish civilization. Repeatable to a maximum of six credits if content differs.

SPAN 452 The Romantic Movement in Spain. (3) Poetry, prose and drama of the Romantic and post-Romantic periods.

SPAN 454 Nineteenth Century Fiction. (3) Significant novels of the nineteenth century.

SPAN 456 Nineteenth Century Drama and Poetry. (3) Significant dramas and poetry of the Realistic period.

SPAN 460 The Generation of 1898 and Its Successors. (3) Authors and works of all genres of the generation of 1898 and those of the immediately succeeding generation.

SPAN 461 The Generation of 1898 and Its Successors. (3) Authors and works of all genres of the generation of 1898 and those of the immediately succeeding generation.

SPAN 462 Twentieth Century Drama. (3) Significant plays of the twentieth century.

SPAN 464 Contemporary Spanish Poetry. (3) Spanish poetry from the generation of 1927 to the present.

SPAN 466 The Contemporary Spanish Novel. (3) The novel and the short story from 1940 to the present.

SPAN 468 Modernism and Post-Modernism in Spain and Spanish-America. (3) A study of the most important works and authors of both movements in Spain and Spanish-America.

SPAN 469 Modernism and Post-Modernism in Spain and Spanish-America. (3) A study of the most important works and authors of both movements in Spain and Spanish-America.

SPAN 470 Applied Linguistics. (3) Nature of applied linguistics and its contribution to the effective teaching of foreign languages. Comparative study of English and Spanish with emphasis upon points of divergence.

SPAN 480 Spanish-American Essay. (3) A study of the socio-political contents and aesthetic qualities of representative works from the Colonial to the Contemporary period.

SPAN 481 Spanish American Essay. (3) A study of the socio-political contents and aesthetic qualities of representative works from the Colonial to the Contemporary period, with emphasis on the essay of the twentieth century.

SPAN 488 Spanish-American Fiction. (3) Representative novels and/or short stories from the Wars of Independence to the present or close analysis of major contemporary works. Subject will be announced each time course is offered.

SPAN 489 Spanish-American Fiction. (3) Representative novels and/or short stories from the Wars of Independence to the present or close analysis of major contemporary works. Subject will be announced each time course is offered.

SPAN 491 Honors Reading Course — Poetry. (3) H — Honors. Supervised reading to be taken by students admitted to the honors program or upon consultation with the instructor.

SPAN 492 Honors Reading Course — Novel. (3) H — Honors. Supervised reading to be taken by students admitted to the honors program or upon consultation with the instructor.

SPAN 493 Honors Reading Course — Drama. (3) H — Honors. Supervised reading to be taken by students admitted to the honors program or upon consultation with the instructor.

SPAN 496 Honors Seminar. (3) H — Honors. Required of all students in the honors program. Other students will be admitted on special recommendation. Conducted in Spanish. Discussion of a central theme with related investigation by students.

SPAN 498 Spanish-American Poetry. (3) Main trends, authors and works from the conquest to Ruben Dario.

Speech

SPCH 100 Basic Principles of Speech Communication. (3) Prerequisite for advanced speech courses. A study of oral communication principles, including verbal and nonverbal language, listening, group dynamics, and public speaking. Emphasis in this course is upon the application of these principles to contemporary problems and upon the preparation of different types of oral discourse. SPCH 100 and 107 may not both be used for credit.

SPCH 107 Technical Speech Communication. (3) A study of oral communication as it is part of technical fields. Emphasis in this course is on the principles and techniques of interviewing, group discussion, listening, and informative and persuasive briefings and speeches. SPCH 100 and 107 may not both be used for credit.

SPCH 110 Voice and Diction. (3) Emphasis upon the improvement of voice, articulation, and phonation. May be taken concurrently with SPCH 100.

SPCH 125 Introduction to Interpersonal Communication. (3) The course will focus on the theory and its application in the area of informal interpersonal communication.

SPCH 200 Public Communication. (3) Prerequisite, SPCH 100 or 107. A study of rhetorical principles and models of speech composition in conjunction with the preparation and presentation of specific forms of public communication.

SPCH 220 Group Discussion. (3) A study of the principles, methods and types of discussion, and their application in the discussion of contemporary problems.

SPCH 230 Argumentation and Debate. (3) A study of the fundamental principles of reasoning, analysis, and evidence preparation of debate briefs and presentation of standard academic debate.

SPCH 240 Oral Interpretation. (3) The oral interpretation of literature and the practical training of students in the art of reading.

SPCH 325 Parliamentary Law. (1) A study of the principles and application of parliamentary law as applied to all types of meetings. Thorough training in the use of Robert's rules of order.

SPCH 330 Argumentation and Debate in Society. (3) Prerequisite, SPCH 230 or consent of instructor. An in-depth study of argumentation in the conduct of contemporary legislative, judicial and political debating.

SPCH 350 Foundations of Communication Theory. (3) A study of oral communicative behavior, including problems and processes of symbolizations, aspects of oral language, the involvement of the talker and listener, kinds of signals, and self-revelation through speech.

SPCH 356 Rhetoric and Society. (3) A survey of fundamental aspects and approaches to rhetorical theory.

SPCH 360 The Rhetoric of Black America. (3) An historical-critical survey of the rhetoric of Black Americans from the Colonial period to the present. Emphasis will be placed on the nature and historical antecedents of contemporary Black power rhetoric.

SPCH 400 Introduction to Research Methodologies in Speech Communication. (3) Prerequisite, speech communication major or minor or consent of instructor. An introductory survey of empirical and historical-critical research methodologies in speech communication. The course is designed to prepare the student to understand and to conduct basic research in the field.

SPCH 420 Advanced Group Discussion. (3) Prerequisite, SPCH 220 or consent of instructor. An examination of current research and techniques in the discussion and conference, including extensive practice in various types of discussions. Emphasis is upon small group leadership and dynamics.

SPCH 422 Interviewing. (3) Prerequisite, permission of instructor. Speech principles and practices basic to recognized types of interview, giving special attention to behavioral objectives and communication variables involved in the process of interviewing.

SPCH 423 Communication Processes in Conferences. (3) Prerequisite, one course in speech communication or consent of

instructor. Group participation in conferences, methods of problem solving, semantic aspects of language, and the function of conferences in business, industry and government settings.

SPCH 424 Business, Industrial and Government Communication. (3) Prerequisite, permission of the instructor. Structure, methodology and application of communication theory in the industrial setting will be emphasized.

SPCH 440 Advanced Oral Interpretation. (3) Prerequisite, SPCH 240. A study of the advanced theories and techniques employed in the interpretation of prose, poetry and drama. Attention is given to selections, analyses, cuttings, script compilations, and the planning of programs and performances in oral interpretation.

SPCH 441 Readers Theatre. (3) Prerequisite, SPCH 240 or consent of instructor. Theories and techniques of readers theatre will be analyzed to enhance the interpreting and directing abilities of students. Special attention will be given to interpretation and direction of prose, drama, and script compilation.

SPCH 450 Classical and Medieval Rhetorical Theory. (3) Prerequisite, SPCH 200 or consent of instructor. The theories of speech-making and speech composition as propounded by the classical rhetoricians. Special attention is given to Plato, Aristotle, Socrates, Cicero, Quintlian, and St. Augustine.

SPCH 451 Renaissance and Modern Rhetorical Theory. (3) Prerequisite, SPCH 200 or consent of the instructor. A study of the development of modern rhetorical theories in Europe and America with consideration of the application of the theories to public address. Special attention is given to Thomas Sheridan, John Walker, George Campbell, Hugh Blair, Richard Whately, James A. Winans, Charles Woolbert, I. A. Richards, and Kenneth Burke.

SPCH 455 Speechwriting. (3) Prerequisite, SPCH 200 or consent of instructor. Intensive study of rhetorical principles of speech composition through study of model speeches and through a practicum in speech writing. Emphasis will be placed on the application of research in speech writing to various forms and styles of speeches.

SPCH 460 American Public Address 1635-1900. (3) Prerequisite, SPCH 200 or consent of the instructor. Course examines the rhetorical development of major historical movements and influential spokesmen from 1635-1900. Emphasis on the reign of theocracy, the American Revolution, the Presidential Inaugural as a rhetorical type, the compromise of 1850, the Lincoln-Douglas debates, the Civil War rhetoric and the Populist movement.

SPCH 461 American Public Address in the 20th Century. (3) Prerequisite, SPCH 200 or consent of instructor. Course examines the rhetorical development of major historical movements and influential spokesmen from 1900 to the present. Focus on the progressive movement, the rise of labor, women's suffrage, McCarthyism and the evolution of pro- and anti-war rhetoric.

SPCH 462 British Public Address. (3) Prerequisite, SPCH 200 or consent of instructor. A biographical, textual and critical-rhetorical study of great British speakers and their influences. Special attention will be devoted to the "Golden Age" of British oratory and to the forms and styles of contemporary speakers.

SPCH 470 Listening. (3) A study of the listening process, listening variables, listening levels, and the development of effective listening behavior.

SPCH 472 Non-Verbal Communication. (3) Survey of nonverbal communication in human interaction; theory and research on proxemics, kinesics and paralinguistics as expression of relationship, affect and orientation within and across cultures.

SPCH 474 Communication Theory and Process. (3) A general survey of introductory material in communication theory.

SPCH 475 Persuasion in Speech. (3) Prerequisite, SPCH 200 or 230. A study of the bases of persuasion with emphasis on recent experimental developments in persuasion.

SPCH 476 Foundations of Speech Behavior. (3) This course will provide a study of the acquisition of speech, the elements that influence speech behavior, the influences of speech behavior, and a theoretical framework for the analysis of communication situations. Students will apply the theory to analysis of specific communication situations.

SPCH 477 Speech Communication and the Study of Language Acquisition. (3) Survey of language acquisition and development in human communication behavior; theory and research on language structure, syntactic, phonological, and cognitive systems as an influence of an individual's orientation and development within and across cultures.

SPCH 478 Speech Communication Colloquium. (1) Current trends and issues in the field of speech communication, stressing recent research methods. Recommended for senior and graduate student majors and minors in speech communication. Repeatable to a maximum of 4 hours.

SPCH 488 Speech Communication Internship. (1-6) Registration by permission of advisor only. This independent internship is designed to give the speech communication student practical career experience with a speech communication professional in the Washington Metropolitan area. Limited to a maximum of six credits.

SPCH 489 Speech Communication Workshop. (1-6) Workshops devoted to special, in-depth study in speech communication. Course may be repeatable to a maximum of six semester hours.

SPCH 498 Seminar. (3) Prerequisites, senior standing and consent of instructor. Present-day speech research.

SPCH 499 Honors Seminar. (3) For honors students only. Readings, symposiums, visiting lectures, discussions.

Statistics and Probability

STAT 100 Elementary Statistics and Probability. (3) Prerequisite, 3 years of college preparatory mathematics and satisfactory performance on SAT test; or MATH 110. Simplest test of statistical hypothesis; applications to before-and-after and matched pair studies. Events, probability, combinations, independence. Binomial probabilities, confidence limits. Random variables, expected values, median, variance. Tests based on ranks. Law of large numbers, normal approximation. Estimates of mean and variance. Credit will be given for only one of the courses STAT 100 or MATH 111.

STAT 250 Introduction to Statistical Models. (3) Prerequisite, MATH 220 or equivalent. Applications of basic ideas of probability and statistics to epidemics, genetics, learning models, population growth, queuing, reliability and traffic problems. Topics include random variables, distributions, expectations, Markov chains, renewals, hypotheses testing and estimation, with emphasis on discrete models and intuitive approach. Choice of applications can vary according to class interest.

STAT 400 Applied Probability and Statistics I. (3) Prerequisites, MATH 141 or 221. Random variables, standard distributions, moments, law of large numbers and central limit theorem. Sampling methods, estimation of parameters, testing of hypotheses.

STAT 401 Applied Probability and Statistics II. (3) Prerequisite, STAT 400. Point estimation — sufficient, unbiased, and consistent estimators. Interval estimation. Minimum variance and maximum likelihood estimators. Testing of hypotheses. Regression correlation and analysis of variance. Sampling distributions. Sequential tests, elements of non-parametric methods.

STAT 410 Introduction to Probability Theory. (3) Prerequisite, MATH 241. Probability and its properties. Random variables and distribution functions in one and several dimensions. Moments. Characteristic functions. Limit theorems.

STAT 411 Introduction to Stochastic Processes. (3) Prerequisite, STAT 250 or 400 or equivalent. Elementary stochastic processes. Renewal process, random walks, branching process, discrete Markov chains, first passage times. Markov chains with a continuous parameter, birth and death processes. Stationary processes.

STAT 420 Introduction to Statistics. (3) Prerequisite, STAT 410 or equivalent. Point estimation, sufficiency, completeness, Cramer-Rao inequality, maximum likelihood. Confidence intervals for parameters of normal distribution. Hypotheses testing, most powerful tests, likelihood ratio tests. Chi-square tests, analysis of variance, regression, correlation. Nonparametric methods.

STAT 421 Elements of Statistical Inference. (3) Prerequisite, STAT 420 or equivalent. Rank tests, confidence and tolerance intervals, Kolmogorov-Smirnov tests. Sequential analysis, multivariate analysis. Decision theory, Bayesian and Minimax procedures. Sampling theory.

STAT 450 Regression and Variance Analysis. (3) Prerequisite, STAT 401 or 420. One, two, three and four layouts in analysis of variance, fixed effects models, linear regression in several variables, Gauss-Markov-Theorem, multiple regression analysis, experimental designs.

STAT 460 Applied Nonparametric Statistics. (3) Prerequisite, A statistics course other than STAT 100. Review of basic statistical ideas. Sign tests and ranking methods for one and two samples, one-way layout, two-way layout, correlation and regression, including significance tests, nonparametric confidence intervals and robust point estimates. Goodness-of-fit, contingency tables, exact and Chi-square test for homogeneity and independence. Techniques illustrated using data from social, biological and behavioral sciences.

STAT 464 Introduction to Biostatistics. (3) Prerequisite, one semester of calculus and junior standing. Probabilistic models. Sampling. Some applications of probability in genetics. Experimental designs. Estimation of effects of treatment. Comparative experiments. Fisher-Irwin test. Wilcoxon tests for paired comparisons. Not acceptable for credit towards degrees in mathematics or statistics.

STAT 477 Optimization. (3) Prerequisite, CMSC 110 and MATH 405 or MATH 474. Linear programming including the simplex algorithm and dual linear programs, convex sets and elements of convex programming, combinatorial optimization, integer programming. (Listed also as MATH 477 and CMSC 477).

STAT 498 Selected Topics in Statistics. (1-6) Prerequisite, permission of the instructor. Topics of special interest to advanced undergraduate students will be offered occasionally under the general guidance of the MATH/STAT major committee. Students register for reading in statistics under this number. Repeatable to a maximum of 16 credits.

Textiles

TEXT 105 Textiles in Contemporary Living. (3) Three lectures per week. A multidisciplinary approach to the consumer in the near environment with emphasis on apparel and environmental textiles.

TEXT 150 Introduction to Textile Materials. (3) Two lectures and one two-hour laboratory per week. An introduction to the properties of textile materials. Behavior of textile materials are observed in relation to environmental conditions which influence aesthetics, comfort and performance.

TEXT 221 Apparel I. (3) Six hours of laboratory per week. A study of the fundamental principles and processes of pattern design and apparel construction. Students will relate flat pattern and construction techniques to apparel design problems.

TEXT 222 Apparel II. (3) Six hours of laboratory per week. Prerequisites, TEXT 150 and TEXT 221. A continuation of Apparel I involving more advanced problems. Emphasis is placed on successful integration of pattern design with construction processes in contemporary fabrics.

TEXT 250 Textile Materials — Evaluation and Characterization. (3) Two lectures and one two-hour laboratory per week. Prerequisite, TEXT 150. An investigation of the behavior of textile materials in relation to environmental factors and conditions of service influencing performance, comfort and aesthetics. Laboratory experience provides an opportunity to explore a variety of textile materials and methods of evaluation.

TEXT 355 Environmental Textiles. (3) Three lectures per week. Prerequisite, TEXT 150. A consideration of the properties, performance and care of textile materials other than clothing used in the near environment. Included are furnishings, floor coverings, wall treatments and recreational and structural materials. Environmental conditions such as soiling, heat, radiation, weathering, aging, moisture and solvents will be considered.

TEXT 365 Fashion Merchandising. (3) Prerequisite, consent of instructor. Analysis of fashion trends and their effect on retail merchandising. Emphasis on the buying and selling process, including the calculations necessary to plan and estimate seasonal purchases, mark-ups, turnover, open-to-buy, markdowns and stock-sales ratios.

TEXT 385 Junior Honors Seminar. (1) Limited to juniors in the departmental honors program. Readings, reports and discussion of selected topics.

TEXT 396 Field Work and Analysis in Textiles. (3-6) Supervised, professional, field work experience in retailing, industry or government. A seminar and a written critique of the field work experience will be required to relate formal academic study to student work

experiences. Students must apply a semester in advance and enrollment is by permission of the department and is limited to majors.

TEXT 420 Apparel Design — Draping. (3) Two three-hour laboratory periods per week. Prerequisites, APDS 101 and TEXT 222. APDS 220 recommended but not required. Students explore pattern design through draping on the human form. Emphasis is on the interrelationship between material, design and form.

TEXT 425 Apparel Design — Experimental Processes. (3) Two three-hour laboratory periods per week. Prerequisites, APDS 101, TEXT 250, and TEXT 222. Processes are related to fiber and fabric characteristics, style and end-use. Opportunities are provided for students to: (1) learn advanced construction and tailoring techniques (2) explore, adapt and create new processes with modern textile materials and (3) evaluate results in terms of design quality.

TEXT 441 Clothing and Human Behavior. (3) Three lectures per week. Prerequisites, PSYC 100 and SOCY 100. An exploration of socio-psychological approaches to the study of clothing in relation to human behavior. Social and psychological theories will be examined as possible framework for the study and investigation of clothing.

TEXT 445 History of Costume I. (3) Three lectures per week. The wrap-style dress. A critical study of the various forms of dress; analyzing shape and form of garments and the component parts of which they are made, taking special note of the various distinctive styles and unique shapes which help distinguish one period from another; relating the history of costume to events, to achievements, to the social attitudes and development of the various times and cultures of man.

TEXT 447 History of Costume II. (3) Three lectures per week. The shaped-style dress. A critical study of the various forms of dress; analyzing shape and form of garments and the component parts of which they are made, taking special note of the distinctive styles and unique shapes which help distinguish one period from another; relating the history of costume to events, to achievements, to the social attitudes and development of the various times and cultures of man.

TEXT 452 Textile Science — Chemical Structures and Properties of Fibers. (3) Two lectures and one three-hour laboratory per week. Prerequisites, CHEM 104 or consent of instructor. The chemical structure, properties and reactions of the major classes of natural and man-made fibers. Emphasis is placed upon the relationship between molecular structure and physical properties of fibers and fabrics. Laboratory includes chemical identification of fibers, preparation of selected fibers and examination of chemical reactions and properties of fibers.

TEXT 454 Textile Science — Finishes. (3) Two lectures and one three-hour laboratory per week. Prerequisite, TEXT 452 or consent of instructor. A study of the chemical reactions and mechanisms involved in imparting water repellance, crease resistance and crease recovery properties, shrink-resistance, flame resistance, soil-release properties and moth and mildew resistance to textile materials. Properties of the finished material which effect its end-use will also be examined. Laboratory work includes the application of finishes, identification of finishes and a study of the properties of finished fabrics.

TEXT 456 Textile Science — Chemistry and Physics of Fibers and Polymers. (3) Two lectures and one three-hour laboratory per week. Prerequisite, consent of instructor. The theory of fiber structure and its relationship to chemical and physical properties of natural and man-made fibers. Laboratory includes study of performance of textile materials in relation to their chemical and physical properties.

TEXT 463 History of Textiles. (3) Three lectures per week. Prerequisite, TEXT 150 or consent of instructor. A study of historic and contemporary fibers and fabrics. Emphasis will be placed on the analysis of designs and techniques of decorating fabrics and the relationship of textiles to the aesthetic and developmental cultures of society.

TEXT 465 Economics of the Textile and Apparel Industry. (3) Three lectures per week. Prerequisites, ECON 201 and 203. Trends in the production and consumption of textiles and apparel; economic analysis of the textile and apparel industries; factors affecting changes in output, price, location and market structure.

TEXT 488 Senior Honors Thesis. (1-4) Limited to undergraduate students in the departmental honors program. An independent literary, laboratory or field study, conducted throughout the student's senior year. Student should register in both fall and spring.

TEXT 498 Special Studies. (2-4) Independent study by an individual student or by a group of students in advanced work not otherwise provided in the department. Students must prepare a description of the study they wish to undertake. The plan must be approved by the faculty directing the study and the department chairman.

Institute for Urban Studies

URBS 100 Introduction to Interdisciplinary Urban Studies. (3) The scope and range of urban studies, and the characteristics of urban life. An interdisciplinary lecture series which meets twice a week, gaming laboratory sessions which meet for two hours once a week, and the development of an urban project. May not be taken by students who have received credit for URBS 260.

URBS 210 Behavioral and Social Dimensions of the Urban Community. (3) Three lecture hours per week. Definition of urbanism, urbanization, and urban demography; study of the institutional framework of urban areas, including administration, politics, finances, and communications; explanation of human services and social issues.

URBS 220 Environmental and Technological Dimensions of the Urban Community. (3) Three lecture hours per week. Issues involved in understanding the impact of environment and technology on urban living. Emphasis on the metropolis as a physical structure, including its housing, land use and geography; on the metropolis as a physical system, including its environment, engineering and utilities; and on public policy issues of technology in the urban areas.

URBS 320 The City and the Developing National Culture of the United States. (3) Prerequisite, permission of instructor or one URBS course. Definition of national culture as contained in values, ideas, ideology, and moral standards but expressed in objects and activities. History of the city in the United States as related to cultural phases; the city and innovation in architecture and sculpture, in literature and the fine arts; individual cities as creators of cultural history; the city and mass culture.

URBS 350 Introduction to Urban Field Study. (3) Prerequisite, permission of instructor or one URBS course. Instruction in the techniques of inquiry into urban conditions. Training in use of descriptive statistics to summarize data. Selection of problems for study, design of research, preparing conclusions. Comparison of team-research approach to individual investigation. Study of the urban community through field projects.

URBS 395 Pro-Seminar in Urban Literatures. (3) Prerequisite, permission of instructor or one URBS course. Critique of urban studies literature in terms of the three interdisciplinary distinctions. Term papers dealing with research problems and trend analysis of the literature in these three areas. Students emphasize the phase of urban studies most relevant to them.

URBS 399 Independent Study in Urban Topics. (3) Prerequisite, permission of instructor or one URBS course. Directed research and study of selected aspects of urban affairs.

URBS 430 Urban Internship. (6) Prerequisite, permission of the department. Supervised field training in urban-oriented programs. Emphasized areas of interest are (1) neighborhoods and communities, (2) organizations and agencies, (3) specific programs. The student will be assigned to a specific agency or project and will be responsible to that agency. Class meetings, written reports, instructor conferences, and a student's critique of his experience are included.

URBS 450 Problems in Urban Law. (3) Recommended preparation: six credits in URBS courses. A survey of the urban legal environment and special legal problems of urban governments and public interest lawyers. Problems related to planning, zoning, eminent domain and land use controls; consumer protection in central cities; housing codes and multiple dwelling regulation; public accommodations and civil rights ordinances; defending the indigent; and welfare delivery systems.

URBS 480 Urban Theory and Simulation. (3) Review of early theories of the city. Contemporary theories of the city as a physical and an institutional system. Urban theory as integration of information involving economic, political, and social dimensions of contemporary cities. Simulation and gaming as theory testing; urban simulation and gaming as theory building.

URBS 499 Selected Topics in Urban Studies. (3) Prerequisite, permission of instructor. Topics of special interest to advanced urban studies undergraduates. Repeatable to a maximum of 6 credits provided subject matter is different.

Zoology

ZOOL 101 General Zoology. (4) Three hours of lecture and two hours of laboratory per week. An introduction to the modern concepts of biological principles and animal life. Emphasis will be placed on the functional aspects of living systems with a survey of the physical and chemical bases of all life processes. Credit

for ZOOL 101 is not counted in the twenty-six hours required for the major.

ZOOL 146 Heredity and Man. (3) Three hours of lecture per week. For non-science students who endeavor to gain an understanding of human genetics so they can intelligently consider how recent discoveries and environmental changes may affect the future of human heredity. Not accepted for credit toward the major.

ZOOL 181 Life in the Oceans. (3) Prerequisite, an introductory course in biological principles. Three lectures per week. Consideration of major groups of animals and plants in various marine environments and man's potential uses and misuses of the ocean. Not accepted for credit towards the zoology major.

ZOOL 201 Human Anatomy and Physiology I. (4) Two hours of lecture and four hours of laboratory per week. Prerequisite, ZOOL 101 or equivalent. A thorough introduction to the anatomy and physiology of the skeletal, muscular, nervous and sensory systems. An introduction into cellular physiology is also included.

ZOOL 202 Human Anatomy and Physiology II. (4) Two hours of lecture and four hours of laboratory per week. Prerequisites, ZOOL 101 or equivalent. A thorough introduction to the anatomy and physiology of the cardiovascular, respiratory, digestive, excretory and reproductive systems. Intermediary metabolism and endocrine relationships.

ZOOL 205 History of Zoology. (1) One hour of lecture per week. Prerequisites, a general grade point average of 3.2 and a GPA in biological subjects of 3.5 or permission of the instructor. A course in the history of the development of zoology involving the historical figures, experiments and ideas which contributed to modern concepts.

ZOOL 206 Zoological Literature. (1) One hour of lecture per week. Prerequisites, a general grade point average of 3.2 and a GPA in biological subjects of 3.5, or permission of the instructor. Discussion of zoological literature, its use and significance.

ZOOL 207 Development of the Human Body. (2) Summer session. A study of the growth and development of the human organism with emphasis on the early development, placentation and morphogenesis of the organ systems. Not accepted for credit toward the major.

ZOOL 209 Basic Study in Zoology. (1-4) Prerequisites, a general grade point average of 3.2 and a GPA in biological subjects of 3.5, or permission of the instructor. Independent study, with supporting laboratory experiments, of the basic disciplines in zoology. Repeatable up to 8 hours credit.

ZOOL 230 Developmental Biology. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites, an introductory course in zoology or equivalent. A course in the principles of development, including morphogenesis, differentiation, pattern formation and genetic control of development.

ZOOL 246 Genetics. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites, one college course in zoology, botany, biology or equivalent and one semester of college chemistry. Basic principles of heredity.

ZOOL 270 Population Biology and General Ecology. (3) Three hours of lecture per week. No prerequisites, designed for elective credit. General introduction to population and community biology, with consideration of principles of evolution, population genetics, population growth and steady states, age structure of populations, multispecies, dependencies, and ecosystem energetics. Illustrations will be drawn both from natural populations and human populations.

ZOOL 271 Population Biology and General Ecology Laboratory. (1) One two-hour laboratory each week. ZOOL 270 to be taken previously or concurrently. Exercises in the laboratory and in the field will illustrate basic principles of population biology, including natural selection, environmental carrying capacity, trophic structure and community interactions. Occasional Saturday field trips will be arranged.

ZOOL 290 Comparative Vertebrate Morphology. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite, one college level course in zoology, biology or equivalent. A comparative study of the organ systems of the vertebrates in terms of structure and function.

ZOOL 293 Animal Diversity. (4) Two lectures and two two-hour laboratories per week. Prerequisites, one semester of college level biology. An introduction to the diversity of form and function in the major groups of animals and factors responsible for this variety.

ZOOL 308 Honors Seminar. (1) H — Honors. One hour of discussion per week. Prerequisite, participation in honors program. Guided discussion of topics of current interest. Repeatable to total of four hours credit.

ZOOL 309 Honors Independent Study. (1-4) H — Honors. Prerequisite, participation in the honors program. Study of classical material by way of guided independent study and laboratory experiments. Repeatable to a total of 12 hours credit.

ZOOL 318 Honors Research. (1-2) H — Honors. Prerequisite, participation in the honors program. A laboratory research problem; required each semester during honors participation and culminating in an honors thesis. Repeatable to a total of eight hours credit.

ZOOL 319 Special Problems in Zoology. (1-2) Prerequisites, a major in zoology or biological sciences, a minimum of 3.0 GPA in the biological sciences and consent of the instructor. Research or integrated reading in zoology. A student may register several times and receive up to 8 semester hours of credit.

ZOOL 328 Selected Topics in Zoology. (1-4) Lectures, seminars, mini-courses and other special instruction in various zoological subjects. The contents and format of the course change frequently and students may register for it more than once up to a total of six credits.

ZOOL 411 Cell Biology. (4) Two hours of lecture, one hour of demonstration-discussion and three hours of laboratory per week. Prerequisites, two years of zoology and organic chemistry, or permission of the instructor. A study of cell structure and function with an emphasis on the activity of subcellular organoids and the mechanisms of coordination and control of cell function.

ZOOL 413 Biophysics. (3) Three lectures a week. Prerequisites, one year of biology, a year of physics and at least one semester of calculus; or permission of the instructor. An introduction to the ideas and methods used in biophysics to analyze the functional components of cells and tissues as physical-chemical systems.

ZOOL 415 Cell Differentiation. (3) Three hours of lecture per week. Prerequisites, a course in development biology, cell biology, molecular genetics or permission of instructor. Cellular and subcellular differentiation, emphasizing the biochemical and ultrastructural bases of these development changes.

ZOOL 421 Neurophysiology. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites, an introductory course in zoology or biology; a semester of organic chemistry; physics, through an introduction to electricity and magnetism; MATH 110 or 115. The physiology of nerves, muscles and sensory receptors and aspects of central nervous system physiology.

ZOOL 422 Vertebrate Physiology. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites, one year of zoology and one semester of organic chemistry. A study of the cardiovascular, hemopoietic, gastro-intestinal, renal and respiratory systems. Chemical and endocrine regulation of physiological functions in higher vertebrates with emphasis on mammals.

ZOOL 426 General Endocrinology. (3) Three hours of lecture per week. Prerequisites, three semesters of animal biology and two semesters of organic chemistry. Functions and the functioning of the endocrine glands of animals with special reference to the vertebrates.

ZOOL 430 Vertebrate Embryology. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite, one year of biology or zoology. Vertebrate embryogenesis, developmental physiology and experimental embryology.

ZOOL 440 Evolution. (3) Three hours of lecture per week. Prerequisites, a course in genetics and a course in animal diversity. A consideration of current thought in regard to the evolution of living organisms.

ZOOL 444 Advanced Evolutionary Biology. (3) Three hours of lecture per week. Prerequisites, ZOOL 440 or equivalent; one semester of calculus. The nature and consequences of organic evolution in relation to present day geography and geologic time. Topics covered will include organic diversity gradients in space and time, rates of evolution, co-evolution and extinctions. Particular emphasis will be placed on the synthesis of information and on construction and evaluation of hypotheses.

ZOOL 446 Molecular Genetics. (3) Three hours of lecture per week. Prerequisites, ZOOL 246 or equivalent and a course in organic chemistry. The molecular basis of gene structure and function. Regulation of differential gene expression.

ZOOL 447 Experimental Genetics. (4) Two hours of lecture and six hours of laboratory per week. Prerequisites, two courses in genetics, one of which included laboratory work, and permission of instructor. A methodology and techniques course considering experimental design, the use of diverse organisms and instrumentation and the presentation and interpretation of data.

ZOOL 460 Ethology. (3) Three hours of lecture per week. Prerequisites, a course in general zoology or equivalent and a course, or current enrollment in, physiology or ecology. An introduction to the principles of animal behavior with emphasis on physiological

bases, ecological correlates and evolutionary aspects of behavior.

ZOOL 461 Ethology Laboratory. (3) One hour of lecture and six hours of laboratory per week. Prerequisite or corequisite, ZOOL 460 or equivalent. Training in the description of behavior, methods of quantification and experimentation, and the mathematical treatment of behavioral data.

ZOOL 470 Advanced Animal Ecology. (2) Two hours of lecture per week. Prerequisites, one year of zoology, a course in calculus and a course in statistics. A course in genetics is strongly recommended. Designed for majors and graduate students in the biological sciences. Topics to include theory of population growth and regulation, life tables and population projection matrices, niche theory, theory of competition and predation, diversity analysis, and energetic modeling. Emphasis will be on current literature and research in ecological theory.

ZOOL 471 Laboratory and Field Ecology. (2) Three hours of laboratory and field work and one hour of discussion per week. Prerequisites, Zoology 470 previously or concurrently. Exercises in laboratory and field will pursue problems of contemporary ecological interest; population density regulation, community structure, niche shape, competition coefficients, pattern diversity, and energetics of ecosystems. Topics will be coordinated with those presented in Zoology 470. Terrestrial and aquatic systems will be studied.

ZOOL 472 Protozoology. (4) Two hours of lecture and six hours of laboratory including field trips per week. Prerequisite, one year of biology. Basic conceptual treatment of free-living and parasitic protozoan functional morphology, life history, and systematics. The laboratory will stress observations of protozoa, living and stained, collected from diverse habits.

ZOOL 475 General Parasitology. (4) Two hours of lecture and six hours of laboratory per week. Prerequisites, two years of zoology and one year of chemistry, or permission of the instructor. A consideration of the phenomenon of parasitism through a study of the structure, function and host relationships of parasitic organisms.

ZOOL 477 Symbiology. (2) Prerequisite, a course in animal diversity. Two lecture hours per week. An introduction to basic concepts of symbiosis. Adaptations for establishment of symbiotic associations, symbiote nutrition and metabolism, responses of the host and ecology of the host-symbiote complex.

ZOOL 480 Aquatic Biology. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite, a course in animal diversity and a course in ecology. An investigation of the causal relationships of freshwater, estuarine and marine biotic communities to their environment.

ZOOL 481 The Biology of Marine and Estuarine Invertebrates. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite, one year of zoology. An in-depth consideration of the taxonomy and functional morphology of the invertebrates, exclusive of insects. Chesapeake Bay forms and the study of living material will be emphasized.

ZOOL 482 Marine Vertebrate Zoology. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite, two years of zoology or permission of the instructor. A consideration of the evolution, taxonomy, morphology, physiology, behavior and ecology of marine and estuarine protochordates and vertebrates.

ZOOL 483 Vertebrate Zoology. (4) Two hours of lecture and four hours of laboratory per week. Prerequisite, one year of zoology or permission of the instructor. The identification, classification, habits, and behavior of vertebrates with emphasis on fresh water, terrestrial and aerial forms, and a consideration of the evolution of living and fossil representatives.

ZOOL 492 Form and Pattern in Organisms. (3) Prerequisites, one year of calculus; one year of physics; one semester of introductory biology. A lecture course in structural and functional interpretation of form in organisms. Pattern formation in morphogenesis, mathematical description of shape, methods, and examples of functional analysis of form, and patterns of morphological diversity through space and time.

ZOOL 495 Mammalian Histology. (4) Two hours of lecture and six hours of laboratory per week. Prerequisites, a course in vertebrate anatomy and a course in vertebrate physiology or permission of the instructor. A study of the microscopic anatomy, ultrastructure and histophysiology of tissues and organs of mammals.

Herbert

Faculty Listing

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Aaron, Henry J., Professor, Part-Time, Economics. B.A., University of California (Los Angeles), 1958; M.A., Harvard University, 1960; Ph.D., 1963.

Abrahamsen, M. A., Visiting Professor, Part-Time, Agricultural and Resource Economics. B.E., River Falls Teachers College, 1930; M.A., University of Wisconsin, 1933; Ph.D., 1940.

Adams, John Q., III, Associate Professor, Economics. A.B., Oberlin College, 1960; Ph.D., University of Texas, 1965.

Adams, William W., Professor, Mathematics. B.A., University of California (Los Angeles), 1959; Ph.D., Columbia University, 1964.

Adelman, Irma, Professor, Economics. B.S., University of California (Berkeley), 1950; M.A., 1951; Ph.D., 1955.

Adkins, Arthur, Associate Professor, Secondary Education. B.S., Saint Cloud State College, 1942; M.A., University of Minnesota, 1947; Ph.D., 1958.

Adler, Isidore, Professor, Chemistry. B.S., Brooklyn College, 1942; B.S., New York University, 1944; M.S., Brooklyn Polytechnic Institute, 1947; Ph.D., 1952.

Agrawala, Ashok K., Assistant Professor, Computer Science. Ph.D., Harvard University, 1970.

Agre, Gene P., Associate Professor, Social Foundations of Education. B.A., Macalester College, 1951; B.S., University of Minnesota, 1953; M.A., 1956; Ph.D., University of Illinois (Urbana), 1964.

Ahalt, Arthur M., Lecturer, Part-Time, Institute of Applied Agriculture. B.S., University of Maryland, 1964; J.D., American University, 1967.

Ahearn, Michael F., Associate Professor, Physics and Astronomy. B.S., Boston College, 1961; Ph.D., University of Wisconsin, 1966.

Ahern, David W., Lecturer, Part-Time, Government and Politics. B.A., Southern Connecticut State College, 1970; M.A., University of Maryland, 1972.

Ahern, Dennis M., Assistant Professor, Philosophy. B.A., University of Michigan, 1966; Ph.D., University of California (Irvine), 1973.

Ahrens, Richard A., Professor, Food, Nutrition and Institution Administration. B.S., University of Wisconsin, 1958; Ph.D., University of California (Davis), 1963.

Albert, Thomas F., Associate Professor, Veterinary Science. B.S., Pennsylvania State University, 1959; V.M.D., University of Pennsylvania, 1962; Ph.D., Georgetown University, 1972.

Albrecht, P., Assistant Professor, Civil Engineering. Dipl. Eng., Swiss Federal Institute of Technology, 1962; Ph.D., Lehigh University, 1972.

Alexander, James C., Associate Professor, Mathematics. B.A., Johns Hopkins University, 1964; Ph.D., 1968.

Alexander, Millard H., Associate Professor, Chemistry. B.A., Harvard University, 1964; Ph.D., 1967.

Allan, J. David, Assistant Professor, Zoology. B.Sc., University of British Columbia, 1966; M.S., University of Michigan, 1968; Ph.D., 1971.

Allan, Thomas K., Associate Professor, Counseling and Personnel Services. B.S., Northwestern University, 1950; M.A., University of Maryland, 1964; Ph.D., 1966.

Allen, Marin P., Instructor, Part-Time, Speech and Dramatic Art. B.A., University of Maryland, 1969; M.A., 1971.

Allen, Redfield W., Professor, Mechanical Engineering. B.S., University of Maryland, 1943; M.S., 1949; Ph.D., University of Minnesota, 1959.

Allen, Russell B., Professor Emeritus, Civil Engineering. B.S., Yale University, 1923.

Alley, Carroll O., Jr., Professor, Physics and Astronomy. B.S., University of Richmond, 1948; M.A., Princeton University, 1951; Ph.D., 1962.

Allgaier, Robert S., Lecturer, Part-Time, Physics and Astronomy. A.B., Columbia University, 1950; A.M., 1952; Ph.D., University of Maryland, 1958.

Almenas, Kazys K., Associate Professor, Chemical Engineering. B.S., University of Nebraska, 1957; Ph.D., University and Polytechnic of Warsaw, 1968.

Almon, Clopper, Jr., Professor, Economics. A.B., Vanderbilt University, 1956; Ph.D., Harvard University, 1961.

Althoff, Sally A., Assistant Professor, Health Education. B.S., Bowling Green State University, 1966; M.Ed., University of Toledo, 1968; Ph.D., 1971.

Amershek, Kathleen G., Associate Professor, Early Childhood Elementary Education. B.S., Indiana State College (Pennsylvania), 1951; M.Ed., Pennsylvania State University, 1957; Ph.D., University of Minnesota, 1966.

Ammon, Herman L., Associate Professor, Chemistry. Sc.B., Brown University, 1958; Ph.D., University of Washington, 1963.

Anand, Davinder K., Professor, Mechanical Engineering. B.S., George Washington University, 1959; M.S., 1961; Ph.D., 1965.

Anastos, George, Professor, Zoology. B.S., University of Akron, 1942; M.A., Harvard University, 1947; Ph.D., 1949.

Anderson, Carl R., Assistant Professor, College of Business and Management. B.S., Pennsylvania State University, 1969; M.B.A., 1971; Ph.D., 1974.

Anderson, C. Raymond, Associate Professor, Secondary Education, Assistant Dean, College of Education. B.S., University of Maryland, 1957; M.Ed., 1959, Ed.D., 1969.

Anderson, Evelyn J., Assistant Professor, Early Childhood Elementary Education. A.B., Bethany College, 1935; M.A., University of Chicago, 1957.

Anderson, Frank G., Associate Professor, Anthropology. A.B., Cornell University, 1941; Ph.D., University of New Mexico, 1951.

Anderson, Henry, Professor, College of Business and Management. B.A., University of London, 1939; M.B.A., Columbia University, 1948; Ph.D., 1959.

Anderson, John D., Jr., Professor and Chairman, Aerospace Engineering. B.S., University of Florida, 1959; Ph.D., Ohio State University, 1966.

Anderson, J. Paul, Professor, Administration, Supervision and Curriculum. B.S., University of Minnesota, 1942; M.A., 1947; Ph.D., 1960.

Anderson, J. Robert, Associate Professor, Physics and Astronomy. B.S., State University of Iowa, 1955; Ph.D., 1963.

Anderson, Lane K., Lecturer, Part-Time, College of Business and Management. B.S., Brigham Young University, 1956; M.Acc., 1966; M.B.A., University of Wisconsin (Madison), 1970; Ph.D., 1970.

Anderson, Nancy S., Professor, Psychology, Assistant Provost, Division of Behavioral and Social Sciences. B.A., University of Colorado, 1952; M.A., Ohio State University, 1953; Ph.D., 1956.

Anderson, Ronnie N., Assistant Professor, College of Business and Management. B.S., University of North Carolina, 1962; Ph.D., 1972.

Anderson, Thornton H., Professor, Government and Politics. A.B., University of Kentucky, 1937; M.A., 1938; Ph.D., University of Wisconsin, 1948.

Anderson, Vernon E., Professor Emeritus, Administration, Supervision and Curriculum. B.S., University of Minnesota, 1930; M.A., 1936; Ph.D., University of Colorado, 1942.

Andrews, Mary, Associate Professor Emerita, English. B.S., New York University, 1929; M.A., 1935; Ph.D., 1941.

Andriole, Stephen J., Assistant Professor, Government and Politics. B.A., Lasalle College, 1971; M.A., University of Maryland, 1973; Ph.D., 1974.

Angeles, Rosalie M., Lecturer, Chemistry. B.S., University of the Philippines, 1957; M.S., American University, 1968; Ph.D., 1971.

Ansello, Edward F., Assistant Professor, Institute for Child Study. A.B., Boston College, 1966; M.Ed., University of Missouri, 1967; Ph.D., 1970.

Antman, S. S., Professor, Mathematics. B.S., Rensselaer Polytechnic Institute, 1961; M.S., University of Minnesota, 1963; Ph.D., 1965.

Armstrong, Ronald W., Professor, Mechanical Engineering. B.E.S., Johns Hopkins University, 1955; M.Sc., Carnegie-Mellon University, 1957; Ph.D., 1958.

Arrighi, Margarite A., Assistant Professor, Physical Education. B.S., University of Richmond, 1958; M.A., University of Maryland, 1962; Ph.D., University of North Carolina (Greensboro), 1974.

Arsenault, Richard J., Professor, Chemical Engineering. B.S., Michigan Technology University, 1957; Ph.D., Northwestern University, 1962.

Ashlock, Robert B., Professor, Early Childhood Elementary Education. B.S., Butler University, 1951; M.S., 1959; Ed.D., Indiana University, 1965.

Ashmen, Roy, Associate Professor, College of Business and Management. B.S., Drexel Institute of Technology, 1935; M.S., Columbia University, 1936; Ph.D., Northwestern University, 1950.

Asimow, Robert M., Professor, Mechanical Engineering. B.S., University of California (Los Angeles), 1953; M.S., 1955; Ph.D., 1958.

Atchison, William F., Professor, Computer Science. A.B., Georgetown College (Kentucky), 1938; M.A., University of Kentucky, 1940; Ph.D., University of Illinois (Urbana), 1943.

Auslander, Joseph, Professor, Mathematics. B.S., Massachusetts Institute of Technology, 1952; M.S., University of Pennsylvania, 1953; Ph.D., 1957.

Austin, Gilbert R., Lecturer, Secondary Education; Associate Director, Bureau of Educational Research and Field Services. B.S., Central Connecticut State College, 1953; M.A.L.S., Wesleyan University, 1956; Ph.D., University of Connecticut, 1965.

Austing, Richard H., Associate Professor, Computer Science. B.S., Xavier University, 1953; M.S., Saint Louis University, 1955; Ph.D., Catholic University of America, 1963.

Averill, Patricia, Assistant Professor, American Studies Program. B.A., Michigan State University, 1966; M.A., University of Pennsylvania, 1967; Ph.D., 1975.

Avery, William T., Professor and Chairman, Classical Languages and Literatures. B.A., Case-Western Reserve University, 1934; M.A., 1935; Ph.D., 1937; Fellow, American Academy in Rome, 1937-1939.

Axley, John H., Professor, Agronomy. B.A., University of Wisconsin, 1937; Ph.D., 1945.

Aycock, Marvin K., Jr., Associate Professor, Agronomy. B.S., North Carolina State College, 1959; M.S., 1963; Ph.D., Iowa State University, 1966.

Aylward, Thomas J., Professor and Chairman, Speech and Dramatic Art. B.S., University of Wisconsin, 1947, M.S., 1949, Ph.D., 1960.

Babuska, Ivo, Research Professor, Mathematics and Institute for Fluid Dynamics and Applied Mathematics. Ph.D., University of Prague, 1960.

Bacik, James J., Lecturer, Air Force Aerospace Studies Program. B.A., Fairfield University, 1954; M.S., University of Arkansas, 1973.

Bagchi, Amitabha, Assistant Professor, Physics and Astronomy. B.Sc., Calcutta University (India), 1964, M.S., University of California (San Diego), 1967, Ph.D., 1970.

Bahl, Surinder, Visiting Assistant Professor, Physics and Astronomy. B.Sc., Punjab University (India), 1958, M.Sc., Aligarh University (India), 1961, Ph.D., Northwestern University, 1970.

Bailey, George, Instructor, Electrical Engineering. B.S.E.E., University of Maryland, 1972; M.S., 1974

Bailey, Martin J., Professor, Economics. B.A., University of California (Los Angeles), 1951; M.A., Johns Hopkins University, 1953, Ph.D., 1956

Bailey, William J., Research Professor, Chemistry. B.S., University of Minnesota, 1943; Ph.D., University of Illinois (Urbana), 1945.

Baird, Janet R., Assistant Professor, Spanish and Portuguese and Secondary Education. B.S., University of Kansas, 1966; M.A., 1971, Ph.D., 1973.

Baker, Donald J., Associate Professor, Hearing and Speech Sciences. B.S., Ohio State University, 1954, M.A., 1956; Ph.D., 1962.

Baker, Edward K., III, Lecturer, College of Business and Management. B.E.S., Johns Hopkins University, 1969, M.S., 1972.

Baker, Robert F., Visiting Professor, Part-Time, Civil Engineering. B.C.E., Ohio State University, 1940; M.S.C.E., Purdue University, 1942.

Baker, Robert L., Associate Professor, Horticulture. A.B., Swarthmore College, 1959, M.S., University of Maryland, 1962; Ph.D., 1965.

Baker, Robert L., Lecturer, Secondary Education. B.A., Georgia State University, 1969; M.B.E., 1972.

Balog, Linda L., Instructor, Physical Education. B.S., University of Pittsburgh, 1969; M.A., University of Maryland, 1971.

Bandel, Vernon A., Associate Professor, Agronomy. B.S., University of Maryland, 1959; M.S., 1962; Ph.D., 1965.

Banerjee, Manoj K., Professor, Physics and Astronomy. B.S., Patna University, 1949; M.S., Calcutta University, 1951; Ph.D., 1956

Banks, Dean, Lecturer, Part-Time, History. B.A., Central State College, 1962; M.A., Oklahoma State University, 1967; Ph.D., University of Texas, 1975.

Bankson, Nicholas W., Associate Professor, Hearing and Speech Sciences. B.S., University of Kansas, 1960; M.A., 1961; Ph.D., 1970.

Banta, Ronald M., Lecturer, Institute of Criminal Justice and Criminology. B.S., American University, 1968, M.A., University of Maryland, 1970.

Baras, John S., Assistant Professor, Electrical Engineering. Dipl.E.E., National Technical University of Athens, 1970; S.M., Harvard University, 1971; Ph.D., 1973.

Barbarin, Oscar A., Assistant Professor, Psychology. A.B., Saint Joseph's Seminary and College, 1968, M.A., New York University, 1971; M.S., Rutgers University, 1973, Ph.D., 1974

Barber, Willard F., Lecturer, Government and Politics. A.B., Stanford University, 1928, M.A., 1929.

Bardasis, Angelo, Associate Professor, Physics and Astronomy. B.A., Cornell University, 1957, M.S., University of Illinois (Urbana), 1959, Ph.D., 1962.

Bareket, Miriam, Visiting Assistant Professor, Mathematics. B.Sc., Tel-Aviv University (Israel), 1964, M.Sc., Hebrew University (Israel), 1968, Ph.D., Tel-Aviv University (Israel), 1974

Barilla, Anthony R., Instructor, Spanish and Portuguese. B.A., University of Maryland, 1969, M.A., 1971.

Barlow, Jewel B., Associate Professor, Aerospace Engineering. B.E., Auburn University, 1963, M.S., 1964, Ph.D., University of Toronto, 1970.

Barnes, Jack C., Associate Professor, English. B.A., Duke University, 1939, M.A., 1947, Ph.D., University of Maryland, 1954.

Barnett, Audrey J., Associate Professor, Zoology. B.A., Wilson College, 1955, M.A., Indiana University, 1957; Ph.D., 1962.

Barnett, Bruce A., Assistant Professor, Physics and Astronomy. B.A., Harvard University, 1965, Ph.D., University of Maryland, 1970.

Barnett, Neal M., Associate Professor, Botany. B.S., Purdue University, 1959, Ph.D., Duke University, 1966.

Barnett, Ronald J., Assistant Professor, Music. B.Mus., University of Rochester, 1960; M.Mus., University of Maryland, 1973.

Barrabini, Micheline G., Instructor, French and Italian. Licence En Droit, Bordeaux (France), 1952, Licence Es Lettres, Aix (France), 1955.

Barrett, James E., Associate Professor, Psychology. B.S., University of Maryland, 1966; Ph.D., Pennsylvania State University, 1971.

Barry, Jackson G., Associate Professor, English. B.A., Yale University, 1950, M.A., Columbia University, 1951; Ph.D., Case-Western Reserve University, 1963.

Barry, Jerome, Lecturer, Part-Time, Music. B.A., Northeastern University, 1961; M.A., Tufts University, 1963.

Bartberger, Carol A., Instructor, Zoology. B.A., Gettysburg College, 1972, M.S., University of Maryland, 1975.

Bartlett, Claude J., Professor and Chairman, Psychology. B.S., Denison University, 1954, M.A., Ohio State University, 1956, Ph.D., 1958.

Bartley, Diane R., Instructor, Physical Education. B.S., Howard University, 1969, M.Ed., Pennsylvania State University, 1970.

Basham, Ray S., Associate Professor, Electrical Engineering. B.S., United States Military Academy, 1945, M.S., University of Illinois (Urbana), 1952; Ph.D., 1962

Basili, Victor R, Associate Professor, Computer Science. B.S., Fordham University, 1961, M.S., Syracuse University, 1963; Ph.D., University of Texas, 1970.

Bates, Marcia J., Assistant Professor, College of Library and Information Services. B.A., Pomona College, 1963; M.L.S., University of California (Berkeley), 1967; Ph.D., 1972.

Bauer, Richard H., Professor Emeritus, History. B.A., University of Chicago, 1924, M.A., 1928, Ph.D., 1935.

Bausell, Charles W., Instructor, Economics. B.A., Catholic University of America, 1969, M.A., University of Maryland, 1971; Ph.D., 1975.

Baxter, Sharon, Instructor, Sociology; Co-ordinator of Undergraduate Office. B.A., University of North Carolina, 1969, M.A., University of Maryland, 1973.

Beal, George M., Professor, Agricultural and Resource Economics. B.S., Utah State University, 1934, M.S., University of Wisconsin, 1938; Ph.D., 1942.

Beale, Robert S., Lecturer, Chemistry. B.S., West Virginia State College, 1932; M.S., University of Pennsylvania, 1935; Ph.D., Pennsylvania State University, 1942.

Beall, Edgar, F., Associate Professor, Physics and Astronomy. B.A., University of California (Berkeley), 1958, Ph.D., 1962.

Beall, Otho T., Jr., Professor, American Studies Program. B.A., Williams College, 1930; M.A., University of Minnesota, 1933, Ph.D., University of Pennsylvania, 1952.

Bean, George A., Associate Professor, Botany. B.S., Cornell University, 1958, M.S., University of Minnesota, 1960, Ph.D., 1963.

Beard, Larry H., Assistant Professor, College of Business and Management. A.B.J., University of Georgia, 1964, M.A., 1965; Ph.D., 1974.

Beasley, Maurine H., Assistant Professor, College of Journalism. B.A., University of Missouri, 1958; B.J., 1958, M.S., Columbia University, 1963; Ph.D., George Washington University, 1974

Beaton, John R., Professor, Food, Nutrition and Institution Administration, Dean, College of Human Ecology. B.A., University of Toronto, 1949; M.A., 1950, Ph.D., 1952.

Beatty, Charles J., Associate Professor, Industrial Education. B.S., Northern Michigan University, 1959, M.S., University of Michigan, 1963, Ph.D., Ohio State University, 1966

Beatty, Yvonne J., Assistant Professor, Music. B.Mus., Michigan State University, 1953, M.Mus., University of Michigan, 1956.

Beauchamp, Virginia W., Assistant Professor, English. B.A., University of Michigan, 1942, M.A., 1948, Ph.D., University of Chicago, 1955.

Bechhoefer, William B., Assistant Professor, School of Architecture. A.B., Harvard College, 1963, M.Arch., Harvard Graduate School of Design, 1967.

Beck, Lucille B., Instructor, Hearing and Speech Sciences. B.A., Adelphi University, 1971, M.A., University of Maryland, 1973.

Becker, Robert H., Instructor, Recreation. B.S., Pennsylvania State University, 1970, M.A., University of Maryland, 1973

Beckmann, Robert B., Professor, Chemical Engineering, Dean, College of Engineering. B.S., University of Illinois (Urbana), 1940, Ph.D., University of Wisconsin, 1944

Bedingfield, James P., Assistant Professor, College of Business and Management. B.S., University of Maryland, 1966, M.B.A., 1968, D.B.A., 1972.

Beiter, Robert J., Senior Specialist, Agricultural and Resource Economics. B.S., University of Maryland, 1952, M.S., 1957

Bell, Roger A., Associate Professor, Physics and Astronomy. B.Sc., University of Melbourne, 1957, Ph.D., Australian National University, 1962

Bellama, Jon M., Associate Professor, Chemistry. A.B., Alleghany College, 1960; Ph.D., University of Pennsylvania, 1966.

Bellows, William J., Assistant Professor, Agricultural and Resource Economics. B.S., Harvard University, 1959, M.S., University of Massachusetts, 1966; Ph.D., 1972

Belz, Herman J., Associate Professor, History. A.B., Princeton University, 1959, M.A., University of Washington, 1963, Ph.D., 1968

Bender, Filmore E., Professor, Agricultural and Resource Economics. B.S., University of California (Davis), 1961, M.S., North Carolina State University, 1964, Ph.D., 1965

Bendler, Deborah D., Assistant Professor, Speech and Dramatic Art. B.S., University of Tulsa, 1970, M.A., Ohio University, 1973, Ph.D., 1974

Benedetto, John J., Professor, Mathematics. B.A., Boston College, 1960, M.A., Harvard University, 1962, Ph.D., University of Toronto, 1964

Benedict, William S., Professor, Institute for Molecular Physics. A.B., Cornell University, 1928, A.M., 1929, Ph.D., Massachusetts Institute of Technology, 1933.

Benesch, William, Professor and Director, Institute for Molecular Physics. B.A., Lehigh University, 1942, M.A., Johns Hopkins University, 1950, Ph.D., 1952

Benjamin, Gail R., Assistant Professor, Anthropology. B.A., Michigan State University, 1964, M.A., University of Minnesota, 1969, Ph.D., 1974.

Bennett, Lawrence, H., Associate Professor, Part-Time, Physics and Astronomy. B.S., City University New York (Brooklyn College), 1951; M.S., University of Maryland, 1955, Ph.D., Rutgers — The State University, 1958

Bennett, Robert L., Associate Professor, Economics. B.A., University of Texas, 1951, M.A., 1955, Ph.D., 1963

Bennett, Stanley W., Associate Professor, Institute for Child Study. B.S., University of Iowa, M.A., 1961, Ph.D., University of Michigan, 1970.

Bentz, Frank L., Jr., Associate Professor, Agronomy. Vice President for Agricultural Affairs and Legislative Relations. B.S., University of Maryland, 1942, Ph.D., 1952

Berenstein, Carlos A., Assistant Professor, Mathematics. Licenciado En Matematicas, University of Buenos Aires, 1966; M.S., New York University, 1969, Ph.D., 1970.

Berg, Kenneth R., Associate Professor, Mathematics. B.S., University of Minnesota, 1960; Ph.D., 1967.

Berger, Bruce S., Professor, Mechanical Engineering. B.S., University of Pennsylvania, 1954, M.S., 1958, Ph.D., 1962

Bergeron, Raymond, Assistant Professor, Chemistry. A.B., Clark University, 1967, Ph.D., Brandeis University, 1973

Bergmann, Barbara R., Professor, Economics. A.B., Cornell University, 1948, M.A., Harvard University, 1955, Ph.D., 1959.

Berman, Joel H., Professor, Music. B.S., Juilliard School of Music, 1951, M.A., Columbia University, 1953, D.M.A., University of Michigan, 1957.

Berman, Louise M., Professor, Administration, Supervision and Curriculum. A.B., Wheaton College, 1950, M.A., Columbia University, 1953; Ed.D., 1960

Bernstein, Allen R., Professor, Mathematics. B.A., California Institute of Technology, 1962, M.A., University of California (Los Angeles), 1964, Ph.D., 1965.

Bernstein, Melvin, Professor, Music, Administrative Dean for Summer Programs. A.B., Southwestern University, 1947, B.Mus., 1948, M.Mus., University of Michigan, 1949, M.A., University of North Carolina, 1954, Ph.D., 1964

Bernthal, John E., Assistant Professor, Hearing and Speech Sciences. B.A., Wayne State University, 1962, M.A., University of Kansas, 1964, Ph.D., University of Wisconsin, 1971.

Berry, Mary F., Associate Professor, History; Provost, Division of Behavioral and Social Sciences. B.A., Howard University, 1961, M.A., 1962, Ph.D., University of Michigan, 1966, J.D., 1970

Berry, Thomas E., Associate Professor, Germanic and Slavic Languages. B.S., Southern Illinois University, 1952, M.A., University of Illinois (Urbana), 1955, Ph.D., University of Texas, 1966

Bertran, Rosemarie, Lecturer, College of Library and Information Services. B.A., Drew University, 1956, M.L.S., Columbia University, 1958

Best, Otto F., Professor, Germanic and Slavic Languages Ph.D., University of Munich, 1963.

Beste, C. Edward, Assistant Professor, Horticultura B.S., Purdue University, 1961; M.S., 1969; Ph.D., 1971

Betancourt, Roger R., Associate Professor, Economics. B.A. Georgetown University 1965; Ph.D., University of Wisconsin, 1969

Bhagat, Satindar M., Professor, Physics and Astronomy B.A., Jammu and Kashmir University, 1950; M.Sc., University of Delhi, 1953; Ph.D., 1956

Bickley, Cynthia B., Assistant Professor, Art B.A., University of Maryland, 1965; M.A., 1967

Bickley, William E., Professor, Entomology B.S., University of Tennessee, 1934; M.S., 1936; Ph.D., University of Maryland, 1940

Bielec, John A., Assistant to the Vice Chancellor for Administrative Affairs B.A., University of Maryland, 1966; M.A., 1969; Ph.D., 1972

Bigbee, Daniel E., Associate Professor, Poultry Science. B.S., Oklahoma State University, 1956; M.S., 1958; Ph.D., Michigan State University, 1962.

Billig, Frederick S., Lecturer. Part-Time, Aerospace Engineering. B.E., Johns Hopkins University, 1955; M.S., University of Maryland, 1958; Ph.D., 1964

Bingham, Alfred J., Professor, French and Italian. B.A., Yale University, 1933; Ph.D., Columbia University, 1939

Birdsall, Esther K., Associate Professor, English. B.A., Central Michigan University, 1947; M.A., University of Arizona, 1950; Ph.D., University of Maryland, 1958

Birk, Janice M., Associate Professor, Counseling and Personnel Services, Counseling Center B.A., Sacred Heart College, 1963; M.A., Loyola University, 1966; Ph.D., University of Missouri, 1970.

Birkner, Francis B., Professor, Civil Engineering. B.S., Newark College of Engineering, 1961; M.S.E., University of Florida, 1962; Ph.D., 1965.

Bish, Robert L., Associate Professor, Institute for Urban Studies. A.B., University of Southern California, 1964; A.M., Indiana University, 1966; Ph.D., 1968.

Bissell, Theodore, Associate Professor Emeritus, Entomology B.S., University of Maryland, 1920; M.S., Cornell University, 1936

Bissonette, Michele G., Instructor, Part-Time, English. B.A., Towson State College, 1969; M.A., University of Maryland, 1971.

Blair, Donald J., Assistant Professor, Chemical Engineering, Director, Engineering Cooperative Education. B.S.M.E., Bradley University, 1957; M.S., University of Florida, 1962; Ph.D., University of Maryland, 1969

Blair, John D., Assistant Professor, Sociology B.A., Gustavus Adolphus College, 1966; M.A., University of Michigan, 1972; Ph.D., 1975.

Blevins, Dale G., Assistant Professor, Botany. B.S., Southwest Missouri State University, 1965; M.S., Missouri University, 1967; Ph.D., University of Kentucky, 1972.

Block, Ira, Assistant Professor, Textiles and Consumer Economics. B.S., University of Maryland, 1963; Ph.D., 1971

Block, Kathleen J., Instructor, Institute of Criminal Justice and Criminology B.A., University of Wisconsin, 1969; M.A., University of Maryland, 1972.

Bloom, Paul N., Assistant Professor, College of Business and Management. B.S., Lehigh University, 1968; M.B.A., University of Pennsylvania, 1970; Ph.D., Northwestern University, 1974

Blough, Glenn O., Professor Emeritus, Early Childhood Elementary Education. B.A., University of Michigan, 1929; M.A., 1932; LL.D., Central Michigan University, 1950.

Bluth, Linda F., Assistant Professor, Special Education. B.A., College of Emporia, 1965; M.S., Kansas State Teachers College, 1966; Ph.D., University of Illinois, 1972.

Blyler, Elaine M., Lecturer, Part-Time, Food, Nutrition and Institution Administration B.A., Simmons College, 1968; M.S., University of Maryland, 1970.

Bobko, Philip, Assistant Professor, Psychology B.S., Massachusetts Institute of Technology, 1970; M.S., Buchnell University, 1972; Ph.D., Cornell University, 1975.

Bobrow, Davis B., Professor and Chairman, Government and Politics B.A., University of Chicago, 1955; B.A., 1956; B.A., Queen's College, Oxford University, 1958; Ph.D., Massachusetts Institute of Technology, 1962.

Bode, Carl, Professor, English. Ph.B., University of Chicago, 1933; M.A., Ph.D., University of Chicago, 1955; Northwestern University, 1938; Ph.D., 1941.

Bolino, August C. Lecturer, Part-Time, Economics. B.B.A., University of Michigan, 1948; M.B.A., 1949; Ph.D., Saint Louis University, 1957.

Bolsaitis, Peter, Professor, Chemical Engineering B.S. California Institute of Technology 1980; Ph.D., Delaware State College, 1964

Bonar, Dale B., Assistant Professor, Zoology B.A., Whitman College, 1967; M.S., University of the Pacific, 1970; Ph.D., University of Hawaii, 1973

Bondurant, Dolores, Instructor, French and Italian. A.B., Morgan State College, 1954; M.A., Howard University, 1956

Bonner, William D., Lecturer, Part-Time, Meteorology B.A., University of Chicago, 1952; B.S., Pennsylvania State University, 1954; M.S., University of Chicago, 1960; Ph.D., 1964

Boss, Peggy H., Assistant Professor, Hearing and Speech Sciences B.A., Mount Mercy College, 1962; M.S., University of Wisconsin, 1963.

Bottino, Paul J., Assistant Professor, Botany B.S., Utah State University, 1964; M.S., 1965; Ph.D., Washington State University, 1969.

Bougas, Stanley J., Lecturer, Part-Time, College of Library and Information Services. A.B., New York University, 1950; M.S.L.S., Columbia University, 1952; L.L.B., Emory University, 1962

Boughner, Robert F., Assistant Professor, Classical Languages and Literatures. B.A., Duke University, 1968; M.A., Johns Hopkins University, 1969; Ph.D., 1975.

Bouwkamp, John C., Associate Professor, Horticulture B.S., Michigan State University, 1964; M.S., 1966; Ph.D., 1969.

Bouwkamp, Ellen L., Instructor, Food, Nutrition and Institution Administration. B.S., Michigan State University, 1967; M.S., University of Maryland, 1973.

Bowering, David J., Assistant Professor, Administration, Supervision and Curriculum. B.Sc., University of Durham (England), 1963; M.A., University of Maryland, 1972; Ph.D., 1975.

Bowers, Mollie H., Assistant Professor, College of Business and Management. B.A., University of Rochester, 1967; M.A., University of Wisconsin, 1969; Ph.D., Cornell University, 1974

Bowie, B. Lucille, Professor Emerita, Institute for Child Study. B.S., University of Maryland, 1942; M.A., Columbia University, 1946; Ed.D., University of Maryland, 1957.

Bowman, Barbara, Instructor, Part-Time, English. B.A., Antioch College, 1970; M.A., University of Maryland, 1972.

Boyd, Alfred C., Jr., Associate Professor, Chemistry B.S., Canisius College, 1951; M.S., Purdue University, 1953; Ph.D., 1959

Boyd, Derek A., Assistant Professor, Physics and Astronomy. B.S., University of Cape Town (S. Africa), 1964; B.S., (Hons.), 1965; M.Sc., 1967; Ph.D., Stevens Institute of Technology, 1973.

Boyle, Regis L., Visiting Professor, Part-Time, College of Journalism A.B., Trinity College, 1933; M.A., Catholic University of America, 1934; Ph.D., 1939.

Brabble, Elizabeth W., Associate Professor, Family and Community Development B.S., Virginia State College, 1960; M.S., Pennsylvania State University, 1966; Ed.D., 1969.

Brace, John W., Professor, Mathematics. B.A., Swarthmore College, 1949; M.A., Cornell University, 1951; Ph.D., 1953.

Bradbury, Miles L., Assistant Professor, History A.B., Harvard University, 1960; A.M., 1961; Ph.D., 1967.

Braddock, Jomills H., II., Assistant Professor, Sociology. B.A., Jacksonville University, 1969; M.S., Florida State University, 1972; Ph.D., 1973.

Bragunier, David L., Lecturer, Part-Time, Music. B.M., Peabody Conservatory of Music, 1961.

Brandon, Janet S., Lecturer, Institute for Child Study. B.A., Eastern Nazarene College, 1951; M.S., University of Rhode Island, 1967; Ph.D., University of Maryland, 1974

Brandt, John C., Professor, Part-Time, Physics and Astronomy. A.B., Washington University (Saint Louis), 1956; Ph.D., University of Chicago, 1960.

Brannigan, Vincent M., Lecturer, Part-Time, Fire Protection Engineering. B.A., University of Maryland, 1973; J.D., Georgetown University, 1975.

Braunstein, Muriel S., Instructor, Hearing and Speech Sciences. B.S., Miami University (Ohio), 1968; M.A., Bowling Green University, 1969

Brauth, Steven E., Assistant Professor, Psychology B.S., Rensselaer Polytechnic Institute, 1967; Ph.D., New York University, 1973.

Breger, Irving A., Visiting Professor, Part-Time, Chemistry B.S., Worcester Polytechnic Institute, 1941; M.S., Massachusetts Institute of Technology, 1947; Ph.D., 1950.

Brenner, Robert N., Instructor, Part-Time, Health Education B.A., University of Maryland, 1973.

Breslow, Marvin A., Associate Professor, History. B.A., University of Nebraska, 1957; A.M., Harvard University, 1958; Ph.D., 1963.

Brewster, H. Stevens, Lecturer, Part-Time, Music. Dipl. Curtis Institute of Music, 1958

Brewster, Premala E., Assistant Professor, Secondary Education B.S., Lucknow University (India), 1956; B.T., Jabalpur University (India), 1957; M.A., New York University, 1961; Ph.D., Cornell University, 1968

Brigham, Bruce M., Associate Professor, Secondary Education B.S., State University College of New York (Brockport), 1949; M.A., 1954; Ph.D., Temple University, 1967

Brill, Dieter R., Professor, Physics and Astronomy B.A., Princeton University, 1954; Ph.D., 1959

Brinkley, Howard J., Professor, Zoology B.S., West Virginia University, 1958; M.S., University of Illinois (Urbana), 1960; Ph.D., 1963

Brodie, Herbert L., Extension Specialist, Agricultural Engineering B.S.A.E., Rutgers — The State University, 1964; M.S., University of Maryland, 1972

Brodsky, Harold, Associate Professor, Geography B.S., City University New York (Brooklyn College), 1954; M.S., Colorado College, 1960; Ph.D., University of Washington, 1966.

Bronson, Edward F., Instructor, Part-Time, English. B.A., American University, 1963; M.A., 1971

Broome, C. Rose, Assistant Professor, Botany B.S., University of Miami, 1965; A.M., University of South Florida, 1968; Ph.D., Duke University, 1974

Brown, Charles C., Assistant Professor, Economics. A.B., Boston College, 1970; M.A., 1970; Ph.D., Harvard University 1974

Brown, Elizabeth Y., Assistant Professor, Secondary Education and Physical Education B.S., Kent State University, 1965; M.Ed., 1967; Ph.D., University of Houston, 1973.

Brown, Gweneth B., Assistant Professor, Special Education. B.S., University of Delaware, 1969; M.Ed., University of Virginia, 1972; Ed.D., 1975.

Brown, John H., Associate Professor, Philosophy A.B., Princeton University, 1952; M.A., 1957; Ph.D., 1958

Brown, Joshua R. C., Professor, Zoology. B.A., Duke University, 1948; M.A., 1949; Ph.D., 1953

Brown, Lewellyn A., Lecturer, Part-Time, College of Business and Management B.B.A., City College of New York, 1962; M.B.A., George Washington University, 1969.

Brown, Margaret L., Instructor, Part-Time, Mathematics. B.A., Columbia University, 1943; M.A., 1948

Brown, Richard, Visiting Associate Professor, Sociology B.A., University of California (Berkeley), 1961; M.A., Columbia University, 1965; Ph.D., University of California (San Diego), 1973.

Brown, Robert A., Associate Professor, Psychology B.A., University of Richmond, 1958; M.A., State University of Iowa, 1961; Ph.D., 1962.

Brown, Russell G., Professor Emeritus, Botany. B.S., West Virginia University, 1929; M.S., 1930; Ph.D., University of Maryland, 1934.

Brown, Samuel E., Associate Professor, English. B.A., Indiana University, 1934; M.A., 1946; Ph.D., Yale University, 1955.

Brown, Bobby M., Instructor, Part-Time, English. B.A., University of Houston, 1968; M.A., 1971.

Browne, Ray B., Professor, American Studies. B.A., University Alabama, 1943; M.A., Columbia University, 1947; Ph.D., University of California (Los Angeles), 1965.

Brush, Stephen G., Professor, History and Institute for Fluid Dynamics and Applied Mathematics A.B., Harvard University, 1955; Ph.D., Oxford University, 1958

Bryan, Carter R., Professor, College of Journalism. B.A., University of California (Berkeley), 1937; Ph.D., University of Vienna, 1940.

Bryan, John L., Professor and Chairman, Fire Protection Engineering B.S., Oklahoma State University, 1953; M.S., 1954; Ed.D., American University, 1965.

Bryer, Jackson R., Professor, English. B.A., Amherst College, 1949; M.A., Columbia University, 1960; Ph.D., University of Wisconsin, 1965.

Buchler, Edward R., Assistant Professor, Zoology. B.S., California State Polytechnic College, 1964; M.A., University of California (Santa Barbara), 1966; Ph.D., University of Montana, 1972.

Buck, Allen C., Associate Professor, Textiles and Consumer Economics; Coordinator for Graduate Studies and Research, College of Human Ecology. B.S., Michigan State University, 1940; M.S., Case-Western Reserve University, 1942; Ph.D., 1947.

Buckley, Frank T., Jr., Associate Professor, Mechanical Engineering. B.S., University of Maryland, 1959; Ph.D., 1968.

Buffkins, Archie L., Assistant Dean, Graduate School. B.S., Jackson State University, 1956; M.A., Columbia University, 1961; Ed.D., 1963.

Buhlig, Paul, Jr. Instructor, English. B.S., Georgetown University, 1950; M.A., University of California (Berkeley), 1954

Bullock, Orin M., Jr., Lecturer, Part-Time, School of Architecture.

Bundy, Mary L., Professor, College of Library and Information Services. A.B., State University College (Potsdam), 1948, M.A., University of Denver, 1951, Ph.D., University of Illinois (Urbana), 1960.

Bunting, Fredericka A., Lecturer, Part-Time, Textiles and Consumer Economics. B.S., University of Oregon, 1969

Bunts, Frank E., Professor, Art. B.S., Case-Western Reserve University, 1964; M.A., Cleveland Institute of Art, 1964.

Burgers, J. M., Research Professor Emeritus, Institute for Fluid Dynamics and Applied Mathematics. Doctor of Mathematics and Physics, University of Leyden, 1918; Doctor Honoris Causa, University Libre de Bruxellis, 1948, Doctor Honoris Causa, University of Poitiers, 1950.

Buric, John, Associate Professor, Animal Science. B.S., West Virginia University, 1948, M.S., University of Maryland, 1952, Ph.D., University of Illinois (Urbana), 1960.

Burke, Frank G., Lecturer, Part-Time, College of Library and Information Services. B.A., University of Alaska, 1955; M.A., University of Chicago, 1959, Ph.D., 1969.

Burkins, Karen E., Lecturer, Part-Time, Special Education. B.A., University of Delawere, 1975.

Burt, Gordon W., Associate Professor, Agronomy. B.S., Tennessee Polytechnical Institute, 1961, M.S., Cornell University, 1964, Ph.D., University of Washington, 1967.

Burt, John J., Professor and Chairmen, Health Education. B.A., Duke University, 1956; M.Ed., University of North Carolina, 1957; M.S., University of Oregon, 1960; Ed.D., 1962.

Butler, Jean M., Lecturer, Part-Time, Dance. B.Ed., Oberlin College, 1948.

Butler, Lillian C., Associate Professor, Food, Nutrition and Institution Administration. B.S., University of Illinois (Urbana), 1941, M.A., University of Texas, 1945; Ph.D., University of California (Berkeley), 1953.

Butler, Richard Roy, Assistant Professor, Institute of Criminal Justice and Criminology. B.A., William Carey College, 1967, M.A., Mississippi University, 1970, Ph.D., 1973.

Butler, Shahla A., Lecturer, Part-Time, Chemistry. B.S., University of Michigan, 1968, M.S., University of Chicago, 1970, Ph.D., 1974

Butterworth, Charles E., Assistant Professor, Government and Politics. B.A., Michigan State University, 1959; Doct., University of Nancy (France), 1961, M.A., University of Chicago, 1962; Ph.D., 1966

Byrne, Richard H., Professor, Counseling and Personnel Services. B.A., Franklin and Marshall College, 1938; M.A., Columbia University, 1947; Ed.D., 1952.

Caceres, Cesar A., Professor, Part-Time, Electrical Engineering. B.S., Georgatown University, 1949, M.D. 1953

Cadman, Theodore W., Professor, Chemical Engineering. B.S., Carnegie Institute of Technology, 1962; M.S., 1964, Ph.D., 1966.

Cain, Jarvis L., Professor, Agricultural and Resource Economics. B.S., Purdue University, 1955, M.S., Ohio State University, 1956; Ph.D., 1961.

Cairns, Gordon M., Professor, Dairy Science. Dean, College of Agriculture. B.S., Cornell University, 1936, M.S., 1938, Ph.D., 1940.

Caldwell, S. Carlton, Jr., Lecturer, Part-Time, College of Journalism. B.A., Louisiana State University, 1971, M.A., University of Maryland, 1974.

Callcott, George H., Professor, History; Vice Chancellor for Academic Affairs. B.A., University of South Carolina, 1950, M.A., Columbia University, 1951, Ph.D., University of North Carolina, 1956.

Campagnoni, Anthony T., Associate Professor, Chemistry A.B., Northwestern University, 1964, Ph.D., Indiana University, 1968.

Campbell, Donald L., Assistant Professor, Veterinary Science. D.V.M., University of Georgia, 1968; M.S., Texas Agricultural and Mechanical University, 1972.

Campbell, Elwood G., Professor, Secondary Education, Assistant to the Dean, College of Education. B.S., Northeast Missouri State College, 1949, M.A., Northwestern University, 1952, Ph.D., 1963.

Campbell, Kenneth, Associate Professor, Art. Dipl., Lowell Technical Institute, 1945.

Campbell, William R., Assistant Professor, Physical Education. B.S., Springfield College, 1949; M.Ed., 1953

Caponio, Joseph F., Lecturer, Part-Time, College of Library and Information Services. B.S., Saint Anselm College, 1951; Ph.D., Georgetown University, 1959

Carbone, Robert F., Professor, Administration, Supervision and Curriculum. B.A., Eastern Montana College, 1953, M.Ed., Emory University, 1958, Ph.D., University of Chicago, 1961

Caron, Dewey M., Associate Professor, Entomology. B.A., University of Vermont, 1964, M.A., University of Tennessee, 1966; Ph.D., Cornell University, 1970.

Carr, John C., Associate Professor, Secondary Education. B.S., District of Columbia Teachers College, 1952, M.F.A., Catholic University of America, 1953, Ph.D., 1965.

Carr, Lewis E., Instructor, Agricultural Engineering. B.S.A.E., Virginia Polytechnic Institute, 1963, M.S., 1970.

Carroll, Edward J., Assistant Professor, Zoology. B.A., Sacramento State College, 1968, Ph.D., University of California (Davis), 1972.

Carroll, Stephen J., Jr., Professor, College of Business and Management. B.S., University of California (Los Angeles), 1957; M.A., University of Minnesota, 1959, Ph.D., 1964.

Carter, Everett C., Professor and Chairman, Civil Engineering. B.S., Virginia Polytechnic Institute, 1958, M.E., University of California (Berkeley), 1959, Ph.D., Northwestern University, 1969.

Carter, Sylvia E., Instructor, Early Childhood Elementary Education. B.A., Howard University, 1973.

Carter, Thomas A., Assistant Professor, Poultry Science. B.S., Pennsylvania State University, 1960; M.S., 1969, Ph.D., 1971.

Case, William R., Lecturer, Part-Time, Aerospace Engineering. B.S.A.E., University of Maryland, 1961, M.S.M.E., Drexel University, 1965, Ph.D., University of Maryland, 1972

Cass, Heather W., Lecturer, School of Architecture. B.A., Mount Holyoke College, 1969, M.Arch., Yale University, 1972.

Castellan, Gilbert W., Professor and Associate Chairman, Chemistry. B.Sc., Regis College, 1945; Ph.D., Catholic University of America, 1949; Sc.D., Regis College, 1967

Castleman, Barry I., Lecturer, Part-Time, Undergraduate Studies. B.S.E., Johns Hopkins University, 1968, M.S.E., 1971

Cate, George A., Assistant Professor, English. B.A., Rutgers — The State University, 1960; M.A., Duke University, 1962; Ph.D., 1967.

Causey, George D., Research Professor, Part-Time, Hearing and Speech Sciences. B.A., University of Maryland, 1950, M.A., 1951; Ph.D., Purdue University, 1954

Celarier, James L., Associate Professor, Philosophy. A.B., University of Illinois (Urbana), 1956, M.A., 1958, Ph.D., University of Pennsylvania, 1960.

Chaiken, Irwin, Lecturer, Part-Time, Chemistry. A.B., Brown University, 1964; Ph.D., University of California (Los Angeles), 1968.

Chaires, James W., Jr., Lecturer, Part-Time, College of Business and Management. B.S., University of Maryland, 1972; M.B.A., 1974

Chalupa, William V., Professor, Dairy Science. B.S., Rutgers — The State University, 1958, M.S., 1959; Ph.D., 1962.

Chan, Sui T. S., Lecturer, Part-Time, Government and Politics. B.A., Tulane University, 1970; M.A., University of Minnesota 1973.

Chance, Charles M., Associate Professor, Dairy Science. B.S., University of Maryland, 1941, B.S., Virginia Polytachnic Institute, 1948, Ph.D., Michigan State University, 1952.

Chang, Chia-Cheh, Assistant Professor, Physics and Astronomy. B.S., Tunghai University (Taiwan), 1961, M.A., University of Southern California, 1966, Ph.D., 1968.

Chang, Chung Y., Associate Professor, Physics and Astronomy. B.S., National Taiwan University, 1954, Ph.D., Columbia University, 1965.

Chang, Ren F., Research Assistant Professor, Physics and Astronomy. B.S., National Taiwan University, 1960; Ph.D., University of Maryland, 1968

Chant, N. S., Assistent Professor, Physics and Astronomy. M.A., Downing College (Cambridge University), 1962, Ph.D., Lincoln College (Oxford University), 1966.

Chapin, John L., Professor, Institute for Child Study. A.B., Denison University, 1939; Ph.D., University of Rochester, 1950.

Chappell, James D., Jr., Instructor, Information Systems Management. A.B., Duke University, 1953, M.S., Columbia University, 1954

Chargois, Josephine A., Assistant Professor, English. B.A., Berber-Scotia College, 1960; M.A.T., Indiana University, 1961, Ph.D., 1974

Chase, Kristine L., Instructor, Economics. B.A., University of California (Davis), 1970; M.A., 1972

Chasnoff, S., Assistent Professor, Counseling and Personnel Services. B.A., University of Connecticut, 1957, M.Ed., University of Maryland, 1968, Ph.D., 1971.

Chatelain, Verne E., Professor Emeritus, History. B.A., Nebraska State Teachers College, 1917, M.A., University of Chicago, 1925, Ph.D., University of Minnesota, 1943

Chaves, Antonio F., Associate Professor, Geography. Bach., University of Havana, 1941, M.A., Northwestern University, 1948, Ph.D., 1946

Chen, Chunjen C., Assistant Professor Emeritus, Oriental and Hebrew Program. B.S., Cornell University, 1919, M.S., University of Maryland, 1920.

Chen, Hsing-Hen, Visiting Assistant Professor, Physics and Astronomy. B.S., National Taiwan University, 1968, M.A., Columbia University, 1970, Ph.D., 1973

Chen, Shirley, Lecturer, Oriental and Hebrew Program. B.Ed., National Taiwan Normal University, 1964, M.S., Georgetown University, 1970.

Chen, Yung-Gann, Assistant Professor, Physics and Astronomy. B.S., National Taiwan University, 1957, M.S., National Chiao-Tung University, 1960; D.Eng.Sc., Columbia University, 1966.

Chin, Tsung, Associate Professor and Director, Oriental and Hebrew Program. B.A., Taiwan Normal University, 1953, Ph.D., Georgetown University, 1971.

Chin-Fatt, Cecil, Lecturer, Physics and Astronomy. B.S., Yale University, 1961, M.S., Cornell University, 1964, Ph.D., University of Maryland, 1972.

Christensen, Cheryl J., Assistent Professor, Government and Politics. B.A., University of Minnesota, 1968, Ph.D., Massachusetts Institute of Technology, 1975

Christhilf, Mark W., Instructor, Part-Time, English. B.A., University of Maryland, 1970, M.A., 1972

Christian, Charles M., Assistent Professor, Geography and Urban Studies. B.A., Northeastern State College, 1966, M.A.A.T., 1968, M.A., University of Illinois (Urbana), 1970, Ph.D., 1975.

Christou, Aristos, Lecturer, Part-Time, Mechanical Engineering. B.A., Columbia University, 1967, M.S., University of Pennsylvania, 1968; Ph.D., 1971.

Chu, Hsin, Professor, Mathemetics. M.S., Tulane University, 1957; Ph.D., University of Pennsylvania, 1959.

Chu, Yaohan, Professor, Computer Science. B.S., 1942, M.S., Massachusetts Institute of Technology, 1945; Sc.D., 1953

Churaman, Charlotte V., Assistant Professor, Family and Community Development. B.Sc., Beree College, 1942, M.Ed., Pennsylvania State University, 1964, Ed.D., 1969

Church, Kenneth R., Associate Professor, Physical Education. B.S., University of Northern Iowa, 1946, M.S., University of Iowa, 1955; Ph.D., Indiana University, 1963

Church, Marilyn G., Associate Professor, Early Childhood Elementary Education. B.S., Indiana University, 1962, M.S., 1963, Ed.D., 1969

Churchill, John W., Associate Professor, Recreation. B.S., State University College (Cortland), 1959, M.S., University of Illinois (Urbana), 1959, Ph.D., University of Wisconsin, 1968

Cicci, Regina L., Assistant Professor, Part-Time, Hearing and Speech Sciences. B.S., Kent State University, 1960, M.A., Northwestern University, 1961.

Cirrincione, Joseph M., Assistent Professor, Geography. Associate Professor, Secondary Education. B.S., State University College (Oswego), 1962, M.A., Ohio State University, 1967, Ph.D., 1970.

Clague, Christopher K., Associate Professor, Economics. B.A., Lafayette College, 1961, Ph.D., Harvard University, 1966

Clague, Monique W., Assistent Professor, Administration, Supervision and Curriculum. B.A., Swarthmore College, 1959, Ph.D., Harvard University, 1969

Clapper, Virginia M., Instructor, Classical Langueges and Literatures. B.A., George Washington University, 1930, M.A., 1932

Clark, Eugenie, Professor, Zoology. B.A., Hunter College, 1942, M.A., New York University, 1946, Ph.D., 1951

Clark, Neri A., Professor, Agronomy. B.S., University of Maryland, 1954, Ph.D., 1959

Clark, Thomas A., Associate Professor, Part-Time, Physics and Astronomy. B.S., University of Colorado, 1961, Ph.D., 1967

Clarke, David H., Professor, Physical Education. B.S., Springfield College, 1952, M.S., 1953, Ph.D., University of Oregon, 1959

Claude, Richard P., Associate Professor, Government and Politics. B.A., College of Saint Thomas, 1956, M.S., Florida State University, 1960, Ph.D., University of Virginia, 1964

Clay, Suzanne H., Instructor, Part-Time, Family and Community Development. B.A., University of Louisville, 1962, M.S., Indiana University, 1965.

Clearwater, Harvey E., Associate Professor, Health Education. A.B., State University of New York (Albany), 1955, M.A., Michigan State University, 1967, Ed.D., 1970.

Clemson, Barry A., Assistant Professor, Administration, Supervision and Curriculum. B.S., Pennsylvania State University, 1965, M.A., 1968, Ph.D., 1975

Clopton, Anna M., Instructor, Speech and Dramatic Art. B.A. University of Kentucky, 1970; M.A. University of Cincinnati, 1971

Clotfelter, Charles T., Assistant Professor, Economics. Bureau of Business and Economic Research. B.A. Duke University, 1969; M.A. Harvard University, 1972; Ph.D. 1974

Cobb, James C., Assistant Professor, History. A.B. University of Georgia, 1969; M.A., 1972; Ph.D. 1975

Cochran, Alexander S., Professor, Part-Time, School of Architecture. A.B. Princeton University, 1935; M.Arch., Harvard Graduate School of Design, 1939

Cockburn, James S., Associate Professor, History. LL.B., Leeds University, 1959; LL.M., 1961; Ph.D., 1970

Coder, David W., Lecturer, Part-Time, Mechanical Engineering. B.S., University of Maryland, 1962; Ph.D., 1973

Cohen, Joel, Associate Professor, Mathematics. Sc.B. Brown University, 1963; Ph.D., Massachusetts Institute of Technology, 1966

Cohen, Leon W., Professor Emeritus, Mathematics. B.A., Columbia University, 1923; M.A., 1925; Ph.D., University of Michigan, 1928

Cohen, Ruth K., Instructor, Family and Community Development. B.A., Brooklyn College, 1952; M.S.W., Hunter College, 1959

Cokely, Jacqueline A., Instructor, Speech and Dramatic Art. B.A., University of New Hampshire, 1968; M.A., Ohio University, 1969

Colangelo, William E., Assistant to the Vice Chancellor for Administrative Affairs. B.S., Syracuse University, 1966; M.S., 1969.

Colburn, Theodore R., Lecturer, Part-Time, Electrical Engineering. B.S.E.E., University of Maryland, 1962; M.S., 1966; Ph.D., 1969

Colby, Margaret A., Assistant Professor, Part-Time, Counseling and Personnel Services. B.A., State University of New York (Albany), 1961; Ed.D., University of Rochester, 1970.

Cole, Brian A., Lecturer, Part-Time, Social Foundations of Education. B.A., American University, 1969; M.Ed., Western Maryland College, 1971

Cole, Mildred B., Assistant Professor, Early Childhood Elementary Education and Mathematics. B.S., University of Illinois (Urbana), 1943; M.S., University of Wisconsin, 1951.

Cole, Wayne S., Professor, History. B.A., Iowa State Teachers College, 1946; M.S., University of Wisconsin, 1948; Ph.D., 1951.

Coles, Carolyn, Instructor, Dance. A.B., Miami University, 1959; M.S., Smith College, 1961.

Coletti, Theresa, Assistant Professor, English. B.A., University of Pittsburgh, 1971; M.A., University of Rochester, 1973; Ph.D., 1975.

Collier, Robert K., Lecturer, Mechanical Engineering. B.S., Arizona State University, 1965; M.S., 1972

Colton, Craig W., Instructor, Recreation. B.S., Utah State University, 1967; M.S., 1970.

Colville, James, Associate Professor, Civil Engineering. B.S., Purdue University, 1959; M.S., 1960; Ph.D., University of Texas, 1970.

Colwell, Rita R., Professor, Microbiology. B.S., Purdue University, 1956; M.S., 1958; Ph.D., University of Washington, 1961

Compton, David, Instructor, Part-Time, Recreation. B.S., Chico State College, 1963; M.S., Indiana University, 1964; Ed.D., University of Utah, 1973

Conner, Patrick W., Instructor, Part-Time, English. B.A., University of Maryland, 1968; M.A., 1970.

Contrera, Joseph F., Associate Professor, Zoology. B.A., New York University, 1960; M.S., 1961; Ph.D., 1966.

Conway, Mary M., Associate Professor, Government and Politics. B.S., Purdue University, 1957; M.A., University of California (Berkeley), 1960; Ph.D., Indiana University, 1965.

Coogan, Robert M., Associate Professor, English. B.A., Iona College, 1954; M.S., DePaul University, 1958; Ph.D., Loyola University, 1967.

Cook, Charles M., Assistant to the Provost, Division of Behavioral and Social Sciences. A.B., Central Michigan University, 1966; M.A., 1967; Ph.D., University of Maryland, 1974

Cook, Clarence H., Associate Professor, Mathematics. B.A., State University of Iowa, 1948; M.S., 1950; Ph.D., University of Colorado, 1962.

Cook, Thomas M., Associate Professor, Microbiology. B.S., University of Maryland, 1955; M.S., 1957; Ph.D., Rutgers — The State University, 1963.

Cooke, George E., Assistant Professor, Mathematics. B.A., Dartmouth College, 1963; M.A., Princeton University, 1965; Ph.D., 1967

Cookson, John T., Jr., Associate Professor, Civil Engineering. B.S., University of Washington, 1961; M.S., 1962; Ph.D., California Institute of Technology, 1966.

Cooley, Franklin D., Professor Emeritus, English. B.A. Johns Hopkins University, 1927; M.A. University of Maryland, 1933; Ph.D., Johns Hopkins University, 1940

Cooper, Jeffrey M., Associate Professor, Mathematics. B.A. Haverford College, 1962; M.S., University of Illinois (Chicago), 1964; Ph.D., 1967.

Cooper, Sherod M., Jr., Associate Professor, English. B.S., Tampa University, 1951; M.A., 1953; Ph.D., University of Pennsylvania, 1963

Coplan, Michael A., Research Associate Professor, Institute for Fluid Dynamics and Applied Mathematics. B.A. Williams College, 1960; Ph.D., Yale University, 1963.

Corbett, Kenneth M., Professor, Botany. B.Sc. McGill University, 1950; Ph.D., Cornell University, 1954.

Corliss, John O., Professor and Chairman, Zoology. B.S., University of Chicago, 1944; B.A., University of Vermont, 1947; Ph.D., New York University, 1951

Corning, Gerald, Professor, Aerospace Engineering. B.S., New York University, 1937; M.S., Catholic University of America, 1953.

Corrigan, Robert A., Professor, English, Provost, Division of Arts and Humanities. A.B., Brown University, 1957; M.A., University of Pennsylvania, 1959; Ph.D., 1967.

Corwin, Burton D., Lecturer, Part-Time, College of Business and Management. B.A., Lehigh University, 1964; M.S., Virginia Polytechnic Institute, 1967; Ph.D., Case-Western Reserve University, 1969

Cory, Ernest N., Professor Emeritus, Entomology. B.S., Maryland Agricultural College, 1909; M.S., 1913; Ph.D., American University, 1926.

Costabile, Salvatore L., Lecturer, Part-Time, College of Library and Information Services. B.S.S., Georgetown University, 1956; M.S.L.S., Catholic University of America, 1963.

Costello, F. T., Instructor, Physical Education. B.S., University of Maryland, 1966

Cote, Rosalie J., Instructor, Zoology. B.A., Rhode Island College, 1973; M.A., 1975.

Cournyn, John B., Associate Professor, Civil Engineering. B.S., University of Alabama, 1946; A.E., 1946; M.S., 1948

Coursey, Robert D., Assistant Professor, Psychology. B.S., Spring Hill College, 1966; Ph.D., University of Rochester, 1970.

Courtright, Benjamin F., Jr., Associate Professor, Information Systems Management. B.S., Johns Hopkins University, 1939; Ph.D., 1968

Cowan, Andrew M., Jr., Visiting Professor, Agricultural Engineering. B.S.A.E., Purdue University, 1951; M.S., Iowa State University, 1955; Ph.D., 1967.

Cox, Evelyn M., Associate Professor, Food, Nutrition and Institutional Administration. B.S., Syracuse University, 1939; M.S., 1948; Ph.D., State University of Iowa, 1960.

Crane, Langdon T., Research Professor, Institute for Fluid Dynamics and Applied Mathematics. A.B., Amherst College, 1952; Ph.D., University of Maryland, 1959.

Crary, David B., Instructor, Part-Time, Economics. B.A., Syracuse University, 1972; M.A., University of Maryland, 1974.

Crensnaw, Albert B., Lecturer, Part-Time, College of Journalism. B.A., Harvard University, 1964; M.S., University of Virginia, 1966; M.S., Columbia University, 1967

Crenshaw, Margaret P., Lecturer, Part-Time, College of Journalism. B.A., Stanford University, 1967; M.A., 1968; J.D., Georgetown University, 1975.

Crites, John O., Professor, Psychology. A.B., Princeton University, 1950; Ph.D., Columbia University, 1957.

Cronin, Frank H., Associate Professor, Physical Education, Director, Golf Course and Range. B.S., University of Maryland, 1946

Crosby, Edmund D., Associate Professor, Industrial Education. B.A., Western Michigan University, 1934; M.A., Colorado State University, 1940.

Crothers, John L., Jr., Senior Specialist, Agricultural and Resource Economics. B.S., University of Maryland, 1949; M.S., 1954.

Cruz, Isagani, Instructor, Part-Time, English. B.S., University of the Philippines, 1965; M.A., Ateneo University, 1970.

Cumberland, John H., Professor, Economics, Acting Director, Bureau of Business and Economic Research. B.A., University of Maryland, 1947; M.A., Harvard University, 1949; Ph.D., 1951.

Cunniff, Patrick F., Professor and Chairman, Mechanical Engineering. B.S., Manhattan College, 1955; M.S., Virginia Polytechnic Institute, 1957; Ph.D., 1962

Cunningham, William D., Lecturer, College of Library and Information Services. B.A. University of Kansas, 1959; M.L.S. University of Texas, 1963

Currie, Douglas G., Associate Professor, Physics and Astronomy. B.E.P. Cornell University, 1958; Ph.D. University of Rochester, 1962

Currier, Albert W., Assistant Professor, Mathematics. B.A. State University of Iowa, 1954; M.A. Johns Hopkins University, 1959; Ph.D., 1968

Curry, William A., Associate Specialist, Animal Science. B.S., University of Maryland, 1960

Curtis, Charles R., Associate Professor, Botany. B.S. Colorado State University, 1961; M.S., 1963; Ph.D. 1965

Curtis, John M., Professor and Chairman, Agricultural and Resource Economics. B.S. North Carolina State University, 1947; M.S., 1949; Ph.D. University of Maryland, 1961

Cussler, Margaret T., Associate Professor, Sociology. B.A. State University of New York (Albany), 1931; M.A., 1933; M.A. (English), Harvard University, 1941; M.A. (Sociology), 1941; Ph.D., 1943

Dachler, H. Peter, Associate Professor, Psychology. B.S., Virginia Commonwealth University, 1963; M.A. University of Illinois (Urbana), 1968; Ph.D., 1969

Dager, Edward Z., Professor, Sociology. A.B., Kent State University, 1950; A.M., Ohio State University, 1951; Ph.D., 1956.

Dainis, Andrew, Assistant Professor, Physical Education. B.S., University of Adelaide, South Australia, 1962; M.A., University of North Carolina (Chapel Hill), 1972; Ph.D., University of Adelaide, 1967

Dally, James W., Professor, Mechanical Engineering. B.S. Carnegie Institute of Technology, 1951; M.S., 1953; Ph.D., Illinois Institute of Technology, 1958

Dalton, Francis E., Lecturer, College of Business and Management. B.S., University of Maryland, 1967; M.B.A. 1969

Daly, George W., Instructor, Part-Time, Industrial Education. B.S., University of Maryland, 1971.

Damron, Bert L., Jr., Lecturer, Part-Time, Music. B.M. University of Michigan, 1951; Ph.D., Florida State University, 1972.

Dancis, Jerome, Associate Professor, Mathematics. B.S. Polytechnic Institute of Brooklyn, 1961; M.S., University of Wisconsin, 1963; Ph.D., 1966

Danzig, Arnold B., Lecturer, Part-Time, Social Foundations of Education. B.A. State University of New York (Buffalo), 1970; M.S., University of Maryland, 1973.

Darden, Lindley, Assistant Professor, Philosophy and History. B.A., Southwestern University, 1968; A.M., University of Chicago, S.M., University of Chicago, 1972; Ph.D., 1974

Dardis, Rachel, Professor, Textiles and Consumer Economics and Economics. B.S., Saint Mary's College (Dublin), 1949; M.S., University of Minnesota, 1963; Ph.D., 1965.

Davey, H. Beth, Assistant Professor, Secondary Education. B.S., University of Miami, 1965; M.A., University of Rochester, 1969; Ph.D., Case-Western Reserve University, 1971

Davidson, John A., Associate Professor, Entomology. B.A. Columbia Union College, 1955; M.S., University of Maryland, 1957; Ph.D., 1960.

Davidson, Marie S., Assistant Professor, Institute for Child Study. B.S., Dillard University, 1959; M.S., University of Maryland, 1967; Ph.D., 1971.

Davidson, Neil A., Assistant Professor, Mathematics. Associate Professor, Secondary Education. B.S., Case Institute of Technology, 1961; M.A., University of Wisconsin (Madison), 1963; Ph.D., 1970.

Davidson, Ronald C., Professor, Physics and Astronomy. B.Sc., McMaster University, 1963; Ph.D., Princeton University, 1966.

Davis, Christopher C., Visiting Assistant Professor, Electrical Engineering

Davis, Douglas A., Associate Professor, Chemistry. B.S., University of Washington, 1962; Ph.D., University of Florida, 1966.

Davis, Fremont P., Lecturer, Housing and Applied Design.

Davis, James F., Lecturer, Part-Time, Industrial Education. B.A., University of Maryland, 1963; M.Ed., 1969; Ph.D., 1972.

Davis, Linda S., Assistant Professor, Psychology. B.A., University of Texas (Austin), 1971; M.A., 1974; Ph.D., 1975.

Davis, Paul D., Instructor, Physical Education. B.S., Columbia Union College, 1967; M.Ed., American University, 1974

Davis, Richard F., Professor and Chairman, Dairy Science. B.S., University of New Hampshire, 1950; M.S., Cornell University, 1952; Ph.D., 1953.

Davis, Ronnie H., Lecturer, Part-Time, Textiles and Consumer Economics. B.B.A., Kent State University, 1967; M.A., University of Akron, 1969; M.A., University of Pittsburgh, 1974

Davis, Shelley G., Assistant Professor, Music. A.B., New York University, 1957, M.A., 1960, Ph.D., 1971.

Dawson, Horace G., Jr., Lecturer, Part-Time, College of Journalism. A.B., Lincoln University, 1949, M.A., Columbia University, 1950; Ph.D., State University of Iowa, 1961.

Dawson, Townes L., Professor, College of Business and Management. B.B.A., University of Texas, 1943, B.S., United States Merchant Marine Academy, 1946, M.B.A., University of Texas, 1947, Ph.D., 1950; LL.B., 1954.

Dawson, Victor C. D., Lecturer, Part-Time, Mechanical Engineering. B.S., Massachusetts Institute of Technology, 1948, M.S., Harvard University, 1951; Ph.D., University of Maryland, 1963.

Day, Thomas B., Professor, Physics and Astronomy; Vice Chancellor for Academic Planning and Policy. B.S., University of Notre Dame, 1952, Ph.D., Cornell University, 1957

Dayem, Hassan A., Instructor, Chemical Engineering. B.S., University of Maryland, 1972, M.S., 1974

Dayton, Chauncy M., Professor, Measurament and Statistics. B.A., University of Chicago, 1955, M.A., University of Maryland, 1963, Ph.D., 1964

Deal, Elwyn E., Associate Professor, Agronomy; Assistant Director, Agricultural Extension Service. B.S., University of Georgia, 1958, M.S., 1960; Ph.D., Rutgers — The State University, 1963.

Dean, S. R., Instructor, Housing and Applied Design. B.A., University of Maryland, 1958, M.A., American University, 1966.

DeBarthe, Jerry V., Associate Professor, Animal Science. B.S., Iowa State University, 1961; Ph.D., 1966.

Debro, Julius, Lecturer, Institute of Criminal Justice and Criminology. B.S., University of San Francisco, 1953; M.A., San Jose State College, 1967.

Decker, A. Morris, Professor, Agronomy. B.S., Colorado State University, 1949, M.S., Utah State University, 1950, Ph.D., University of Maryland, 1953

DeClaris, Nicholas, Professor, Electrical Engineering. B.S., Texas Agricultural and Mechanical University, 1952, S.M., Massachusetts Institute of Technology, 1954, Sc.D., 1959

Degelman, Larry O., Associate Professor, School of Architecture. B.A.E., Pennsylvania State University, 1961; M.S., 1966.

Deleiris, Alain, Professor, Art. B.F.A., Rhode Island School of Design, 1948, A.M., Harvard University, 1952, Ph.D., 1957

Deleiris, Mary, Instructor, Art. B.F.A., Rhode Island School of Design, 1948

DeLorenzo, William E., Assistant Professor, Secondary Education. B.A., Montclair State College, 1959; M.A., 1964, Ph.D., Ohio State University, 1971.

DeMaitre, Ann, Associate Professor, French and Italian. B.A., Columbia University, 1950; M.A., University of California (Berkeley), 1951, M.S., Columbia University, 1952; Ph.D., University of Maryland, 1965.

DeMaree, Constance H., Instructor, English. B.A., University of Maryland, 1944, M.A., 1945.

Deming, Drake, Lecturer, Physics and Astronomy. B.A., University of Chicago, 1970, Ph.D., University of Illinois (Urbana), 1975.

DeMonte, Claudia A., Lecturer, Art. B.A., College of Notre Dame of Maryland, 1969; M.F.A., Catholic University of America, 1971

Denny, Don, Professor, Art. B.A., University of Florida, 1959; M.A., New York University, 1961, Ph.D., 1965.

DeRocco, Andrew G., Professor, Institute for Molecular Physics. B.S., Purdue University, 1951, M.S., University of Michigan, 1953, Ph.D., 1956.

Deshler, Walter W., Professor, Geography. B.S., Lafayette College, 1943, M.A., University of Maryland, 1953, Ph.D., 1957.

DeSilva, Alan W., Professor, Physics and Astronomy. B.S., University of California (Los Angeles), 1954, Ph.D., University of California (Berkeley), 1961

Dessaint, Alain Y., Assistant Professor, Anthropology. B.A., University of Chicago, 1961, M.A., Stanford University, 1962, Ph.D., University of Hawaii, 1972

Destler, William W., Assistant Professor, Electrical Engineering. B.S., Stevens Institute of Technology, 1968, Ph.D., Cornell University, 1972.

Deutsch, Donald R., Instructor, Information Systems Management. B.S., Miami University (Ohio), 1965, M.B.A., University of Maryland, 1967

Devermond, Mary F., Professor Emerita, Music. B.Mus., Howard University, 1942; M.A., Columbia University, 1948, Ed.D., University of Maryland, 1959.

Devine, Donald J., Associate Professor, Government and Politics. B.B.A., Saint Johns University, 1959, M.A., City University of New York (Brooklyn College), 1965, Ph.D., Syracuse University, 1967.

Devoe, Howard J., Associate Professor, Chemistry. A.B., Oberlin College, 1955, Ph.D., Harvard University, 1960

Dick, Kenneth A., Visiting Associate Professor, Part-Time, Institute for Molecular Physics. B.Sc., University of British Columbia, 1960, M.Sc., 1963, Ph.D., 1966

Dies, Robert R., Associate Professor, Psychology. B.S., Carroll College, 1962, M.A., Bowling Green State University, 1964, Ph.D., University of Connecticut, 1968

Dietz, Maureen A., Associate Professor, Early Childhood Elementary Education. B.S., Creighton University, 1964, M.S., University of Pennsylvania, 1968, Ed.D., 1968

DiFrederico, Frank R., Associate Professor, Art. B.A., University of Massachusetts, 1955, M.A., Boston University, 1961, Ph.D., New York University, 1970

DiJulio, Carol F., Instructor, College of Journalism. B.S., University of Maryland, 1972; M.A., 1975.

Dillard, Dudley, Professor, Economics. B.S., University of California (Berkeley), 1935, Ph.D., 1940.

Dillon, Conley H., Professor, Government and Politics. B.A., Marshall University, 1928, M.A., Duke University, 1933, Ph.D., 1936.

Diner, Stephen J., Lecturer, Part-Time, American Studies Program. B.A., State University of New York (Binghamton), 1966, M.A., 1968, Ph.D., University of Chicago, 1972.

Dingwall, William O., Associate Professor and Director, Linguistics Program. B.S., Georgetown University, 1957, Ph.D., 1964

Dittmann, Laura L., Professor, Institute for Child Study. B.S., University of Colorado, 1938, M.A., University of Maryland, 1963, Ph.D., 1967.

Dixon, Jack R., Associate Professor, Part-Time, Physics and Astronomy. B.S., Case-Western Reserve University, 1948, M.S., 1950, Ph.D., University of Maryland, 1956.

Dodge, Norton T., Associate Professor, Economics. A.B., Cornell University, 1948; M.A., Harvard University, 1951, Ph.D., 1960.

Doetsch, Raymond N., Professor, Microbiology. B.S., University of Illinois (Urbana), 1942; M.A., Indiana University, 1943, Ph.D., University of Maryland, 1948.

Doherty, Ruth, Instructor, Chemistry. B.S., University of Maryland, 1970; M.S., 1973.

Donaldson, Bruce K., Associate Professor, Aerospace Engineering. A.B., Columbia University, 1954, B.S., 1955; M.S., University of Wichita, 1963; Ph.D., University of Illinois (Urbana), 1968.

Donawerth, Jane L., Assistant Professor, English. B.A., Miami University, 1969; M.A., University of Wisconsin, 1970; Ph.D., 1975.

Dorfman, Jay R., Professor, Physics and Astronomy and Institute for Fluid Dynamics and Applied Mathematics. A.B., Johns Hopkins University, 1957; Ph.D., 1961.

Dorsey, John W., Associate Professor, Economics, Vice Chancellor for Administrative Affairs. B.S., University of Maryland, 1958; Cert., London School of Economics, 1959, M.A., Harvard University, 1962; Ph.D., 1963.

Doszkocs, Tamas E., Lecturer, College of Library and Information Services. M.L.S., University of Maryland, 1969, M.S., 1972.

Dotson, Charles O., Associate Professor, Physical Education. B.A., Morehead State University, 1963, M.S., Purdue University, 1964, Ph.D., 1968.

Doudna, Mark E., Assistant Professor, Hearing and Speech Sciences. B.S., Ohio State University, 1948, M.A., 1956, Ph.D., 1962.

Douglass, Larry W., Associate Professor, Dairy Science. B.S., Purdue University, 1964, M.S., 1966; Ph.D., Oregon State University, 1969

Douglis, Avron, Professor, Mathematics. A.B., University of Chicago, 1938, M.S., New York University, 1948, Ph.D., 1949.

Downard, Jack D., Lecturer, History. B.A., Wake Forest University, 1967, M.A., Indiana University, 1969, A.B.D., 1973

Doyle, Terrence A., Instructor, Speech and Dramatic Art. B.S., University of Wisconsin (Platteville), 1970, M.A., University of Nebraska, 1972

Doyle, Thomas H., Lecturer, College of Business and Management. B.S.I.A., United States Air Force Academy, 1966, M.B.A., Southern Illinois University (Edwardsville), 1971.

Dragt, Alex J., Professor and Chairman, Physics and Astronomy. A.B., Calvin College, 1958, Ph.D., University of California (Berkeley), 1963

Drew, H. Dennis, Associate Professor, Physics and Astronomy. B.S., University of Pittsburgh, 1962, Ph.D., Cornell University, 1967

Drum, Barbara A., Instructor, Physical Education. B.S., Pennsylvania State University, 1958, M.A., University of Iowa, 1963

Dubester, Henry J., Associate Professor and Acting Dean, College of Library and Information Services. B.S.S., City University of New York (City College), 1939, M.A., Columbia University, 1946

Dudley, James, Professor, Administration, Supervision and Curriculum. B.A., Southern Illinois University, 1951, M.S., 1957, Ed.D., University of Illinois (Urbana), 1964

Dudley, Leighton W., Lecturer, Part-Time, Institute of Criminal Justice and Criminology. A.B., University of North Carolina, 1938, J.D., Harvard University, 1947

Duffey, Dick, Professor, Chemical Engineering. B.S., Purdue University, 1939, M.S., State University of Iowa, 1940, Ph.D., University of Maryland, 1956

Duffey, Robert V., Professor, Early Childhood Elementary Education. B.S., Millersville State College, 1938, M.E., Temple University, 1948, Ed.D., 1954

Duffy, John, Priscilla Alden Burke Professor, History. B.A., Louisiana State University, 1941, M.A., 1943, Ph.D., University of California (Los Angeles), 1946

Dulbe, Katrina L., Assistant Professor, Germanic and Slavic Languages. M.S., Georgetown University, 1962, LL.M., University of Latvia, 1931, Ph.D., Georgetown University, 1970

Dumm, Thomas, Lecturer, Part-Time, Music. B.M., Cleveland Institute of Music.

Dumonceau, Michael P., Lecturer, Speech and Dramatic Art. B.A., University of Maryland, 1966, M.A., 1968.

Dunn, Norma E., Assistant Professor, English. B.A., Madison College, 1946, M.A., University of Pennsylvania, 1953, Ph.D., 1968

Dutta, Sukanta K., Associate Professor, Veterinary Science. B.Sc., Bombay University (India), 1956, M.S., University of Minnesota, 1960, Ph.D., 1962

Dworzecka, Maria, Visiting Assistant Professor, Physics and Astronomy. M.Sc., Warsaw University (Poland), 1964, Ph.D., 1969

Earl, James A., Professor, Physics and Astronomy. B.S., Massachusetts Institute of Technology, 1953, Ph.D., 1957

Edelson, Charles B., Associate Professor and Assistant Dean, College of Business and Management. B.B.A., University of New Mexico, 1949, M.B.A., Indiana University, 1950.

Eden, Henry S., Assistant Professor, Electrical Engineering. M.D., Boston University, 1970.

Edmister, Robert O., Associate Professor, College of Business and Management. B.S., Miami University, 1964, M.B.A., University of Michigan, 1965; Ph.D., Ohio State University, 1970.

Edmundson, Harold, Professor, Mathematics and Computer Science. B.A., University of California, 1946, M.A., 1948, Ph.D., 1953

Ehrlich, Gertrude, Professor, Mathematics. B.S., Womens College of Georgia, 1943, M.A., University of North Carolina, 1945, Ph.D., University of Tennessee, 1953

Einstein, Theodore L., Visiting Assistant Professor, Physics and Astronomy. B.A., Harvard University, 1969, M.A.,1969, Ph.D., University of Pennsylvania, 1973

Eisenberg, John F., Visiting Professor, Zoology. B.S., Washington State University, 1957, M.A., University of California (Berkeley), 1959, Ph.D., 1962

Elder, Stephen D., Assistant Professor Germanic and Slavic Languages. B.A., Kalamazoo College, 1962, M.A., Ohio State University, 1964, Ph.D., 1969.

Eley, George, Jr., Associate Professor, Early Childhood Elementary Education. B.S., Ohio State University, 1952, M.Ed., 1957, Ph.D., 1966.

Eliot, John, Associate Professor, Institute for Child Study. 1968 A.B., Harvard University, 1956, A.M.T., 1958, Ed.D., Stanford University, 1966

Elkin, Stephen L., Associate Professor, Government and Politics. B.A., Alfred University, 1961, Ph.D., Harvard University, 1969

Elkins, Earleen F., Research Assistant Professor, Part-Time Hearing and Speech Sciences. B.A., University of Maryland, 1954, M.A., 1956, Ph.D., 1967

Elkins, Richard L., Assistant Professor, Industrial Education. B.S., University of Maryland, 1953, M.A., 1958, Ed.D., 1972

Elkins, Wilson H., President of the University. B.A., University of Texas, 1932, M.A., 1932, B.Litt., Oxford University, 1936, Ph.D., 1936

Ellingson, R. G., Assistant Professor, Meteorology. B.S., Florida State University, 1967, M.S., 1968, Ph.D., 1972

Elliott, Teresa G., Lecturer, Speech and Dramatic Art. B.A., Catholic University of America, 1950, M.C.A., 1970

Ellis, Delbert N., Instructor, Part-Time, Housing and Applied Design. B.S., Pennsylvania State University, 1959

Ellis, Robert L., Associate Professor, Mathematics. A.B., Miami University (Ohio), 1960; Ph.D., Duke University, 1966

Elliston, Ronald J., Assistent Professor, Music. B.S., University of Illinois (Urbana), 1970; M.S., 1973

Ellsworth, Robert W., Assistant Professor, Physics and Astronomy. B.S., Yale University, 1960; Ph.D., University of Rochester, 1965

Elsasser, Walter M., Research Professor Emeritus, Institute for Fluid Dynamics. Ph.D., University of Goettingen (Germany), 1927

Elsing, Evelyn L., Assistant Professor, Music. B.Mus., University of Michigan, 1970; M.Mus., 1971.

Elsmore, Timothy F., Lecturer, Part-Time, Counseling and Personnel Services. B.S., Arizona State University, 1965; Ph.D., 1969.

Emad, Fawzi P., Associate Professor, Electrical Engineering. B.S.E.E., American University (Beirut), 1961; M.S., Northwestern University, 1963; Ph.D., 1966

Emans, Robert, Professor, Early Childhood Elementary Education; Dean, College of Education. B.S., University of Wisconsin, 1957; M.A., University of Chicago, 1958; Ph.D., 1963

Emerson, Peter M., Visiting Assistant Professor, Textiles and Consumer Economics. B.S., Cornell University, 1967; M.S., 1968; Ph.D., Purdue University, 1972

Enis, Charles R., Lecturer, College of Business and Management. B.S., University of Maryland, 1968; 1972, M.B.A., 1974

Ephremides, Anthony, Associate Professor, Electrical Engineering. B.S., National Technical University of Athens, 1967; M.A., 1969; Ph.D., Princeton University, 1971.

Erdahl, William, Instructor, Housing and Applied Design. B.S., Bucknell University, 1962; M.S., University of Wisconsin, 1965; M.F.A., 1968.

Erickson, William C., Professor, Physics and Astronomy. B.A., University of Minnesota, 1951; M.A., 1955; Ph.D., 1956.

Esseff, Peter J., Lecturer, Part-Time, Administration, Supervision and Curriculum. A.B., Fordham University, 1958; M.A., 1961; Ph.D., Catholic University of America, 1969

Etheridge, George A., Assistant Professor, Music. B.Mus., University of Michigan, 1967; M.Mus., 1968.

Evans, Martha C., Assistant Professor, Early Childhood Elementary Education. B.A., Stanford University, 1966; M.S.Ed., Indiana University, 1969; Ed.D., 1974.

Eyler, Marvin H., Professor, Physical Education; Dean, College of Physical Education, Recreation and Health. A.B., Houghton College, 1942; M.S., University of Illinois (Urbana), 1948; Ph.D., 1956.

Faber, John E., Professor Emeritus, Microbiology. B.S., University of Maryland, 1926; M.S., 1927; Ph.D., 1937

Fain, Gerald S., Instructor, Recreation. B.S., Springfield College, 1969; M.S., University of North Carolina, 1971.

Falcione, Raymond L., Assistant Professor, Speech and Dramatic Art. B.A., University of Akron, 1965; M.A., 1967; Ph.D., Kent State University, 1972

Falk, David S., Professor, Physics and Astronomy. B.Eng.Phys., Cornell University, 1954; M.S., Harvard University, 1955; Ph.D., 1959

Feller, Alan J., Research Professor, Institute for Fluid Dynamics and Applied Mathematics. B.S., Massachusetts Institute of Technology, 1951; M.S., 1953; D.Sc., 1957.

Fanning, Delvin S., Associate Professor, Agronomy. B.S., Cornell University, 1954; M.S., 1959; Ph.D., University of Wisconsin, 1964

Fanos, Stavroula A., Associate Professor, Music. B.Mus., Oberlin College, 1957; M.Ed., University of Maryland, 1963; Ed.D., 1970.

Farquhar, James D., Assistant Professor, Art. B.A., Washington and Lee University, 1963; M.A., University of Chicago, 1966; Ph.D., 1972

Farrell, Richard T., Associate Professor, History and Secondary Education. B.A., Wabash College, 1954; M.S., Indiana University, 1958; Ph.D., 1967.

Faild, Robert M., Lecturer, School of Architecture. B.A., Brown University, 1963; M.Arch., Yale University, 1968.

Feldbaum, Eleanor, Lecturer, Part-Time, Government and Politics. B.A., American University, 1969; M.A., 1970; Ph.D., University of Maryland, 1973.

Fellows, Frank C., Assistant Dean, College of Physical Education, Recreation and Health. B.S., University of Maryland, 1953; M.A., 1957.

Felton, Kenneth E., Associate Professor, Agricultural Engineering. B.S., University of Maryland, 1950; B.S.C.E., 1951; M.S., Pennsylvania State University, 1962.

Fenton, Peter C., Visiting Assistant Professor, Mathematics. B.Sc., University of Melbourne (Australia), 1969; M.Sc., 1971; Ph.D., Imperial College (London), 1974

Ference, Mary L., Instructor, English. B.A., Mount Mercy College, 1968; M.A., University of Maryland, 1970

Ferraioli, Joseph, Lecturer, Art. B.I.D., Pratt Institute of Art, 1964; M.F.A., Columbia University, 1970

Ferrell, Richard A., Professor, Physics and Astronomy. B.S., California Institute of Technology, 1948; M.S., 1949; Ph.D., Princeton University, 1952

Fey, James T., Associate Professor, Mathematics and Secondary Education. B.S., University of Wisconsin, 1962; M.S., 1963; Ph.D., Columbia University, 1968

Fidelholtz, James L., Assistant Professor, Linguistics Program. S.B., Massachusetts Institute of Technology, 1963; Ph.D., 1968.

Fink, Beatrice C., Associate Professor, French and Italian. B.A., Bryn Mawr College, 1953; M.A., Yale University, 1956; Ph.D., University of Pittsburgh, 1966

Finkelstein, Barbara, Associate Professor, Social Foundations of Education. B.A., Barnard College, 1959; M.A., Columbia University, 1960; Ph.D., 1970.

Finkleman, David, Lecturer, Part-Time, Aerospace Engineering. B.S., Virginia Polytechnic Institute, 1963; M.S., Massachusetts Institute of Technology, 1964; Ph.D., 1968

Finsterbusch, Kurt, Assistant Professor, Sociology. B.A., Princeton University, 1957; B.D., Grace Theological Seminary, 1960; Ph.D., Columbia University, 1969.

Fish, Gertrude S., Assistant Professor, Housing and Applied Design. B.S., Cornell University, 1968; M.A., 1970; Ph.D., 1973.

Fisher, Allan J., Visiting Professor, Part-Time, College of Business and Management. B.S., University of Pennsylvania, 1928; Lit.M., 1936; Ph.D., 1937.

Fisher, Anthony C., Associate Professor, Economics, Acting Director, Bureau of Business and Economic Research. B.A., Columbia College, 1962; Ph.D., 1968.

Fisher, Elizabeth J., Lecturer, Chemistry. B.S., University of Maryland, 1972; M.S., 1975.

Fitzgibbons, Shirley A., Lecturer, Secondary Education and College of Library and Information Services. B.S., State University College of New York (Oswego), 1958; M.L.S., Syracuse University, 1965.

Fitzpatrick, Patrick M., Assistant Professor, Mathematics. B.A., Rutgers University, 1966; Ph.D., 1971.

Fivel, Daniel I., Associate Professor, Physics and Astronomy. B.A., Johns Hopkins University, 1953; Ph.D., 1959.

Flack, James K., Jr., Associate Professor, History. B.A., Albion College, 1959; M.A., Wayne State University, 1963; Ph.D., 1968

Flatter, Charles H., Associate Professor, Institute for Child Study. B.A., Depauw University, 1961; M.A., University of Toledo, 1965; Ed.D., University of Maryland, 1968.

Fleck, Jere, Associate Professor, Germanic and Slavic Languages. Ph.D., University of Munich, 1966.

Fleig, Albert J., Jr., Lecturer, Part-Time, Aerospace Engineering. B.S.E.S., Purdue University, 1958; Ph.D., Catholic University of America, 1968.

Fleisig, Heywood W., Lecturer, Part-Time, Economics. B.A., Swarthmore College, 1961; M.A., Yale University, 1963; Ph.D., 1969.

Fleming, Leon B., Associate Professor, Music. B.S., East Carolina College, 1948; M.Mus., Westminster Choir College, 1950.

Fleming, Rudd, Professor Emeritus, English. B.A., University of Chicago, 1930; M.A., Cornell University, 1932; Ph.D., 1934

Florestano, Patricia S., Assistant Professor, Institute of Urban Studies. B.A., University of Maryland, 1958; M.A., 1970; Ph.D., 1974.

Fogle, David P., Lecturer and Assistent Dean, School of Architecture. A.B.Arch., Princeton University, 1951; M.C.P., University of California (Berkeley), 1958.

Folsom, Kenneth E., Associate Professor, History. A.B., Princeton University, 1943; A.B., Instructor, California (Berkeley), 1955; M.A., 1957; Ph.D., 1964.

Folstrom, Roger J., Professor, Music and Secondary Education. B.S., College of Saint Thomas, 1956; M.Ed., 1959; M.Mus., Northwestern University, 1963; Ph.D., 1967.

Fonaroff, L. Schuyler, Professor, Geography. B.A., University of Arizona, 1955; Ph.D., Johns Hopkins University, 1961.

Foncannon, Gerald E., Lecturer, Part-Time, Institute of Applied Agriculture. B.S., Texas Technological College, 1941.

Forbes, James H., Associate Professor, Art. B.A., University of Maryland, 1964; M.A., 1966.

Ford, Gary T., Assistant Professor, College of Business and Management. B.B.A., Clarkson College of Technology, 1966; M.B.A., State University of New York (Buffalo), 1968; Ph.D., 1973

Formisane, Roger A., Lecturer, College of Business and Management. B.A., University of New Hampshire, 1971

Forrer, Stephen E., Lecturer, Part-Time, Industrial Education. B.A., Gettysburg College, 1969; M.A., University of Maryland, 1970; Ph.D., 1972

Foss, John E., Professor, Agronomy. B.S., Wisconsin State University (River Falls), 1957; M.S., University of Minnesota, 1959; Ph.D., 1965

Foster, John E., Professor and Chairmen Emeritus, Animal Science. B.S., North Carolina State University, 1928; M.S., Kansas State University, 1927; Ph.D., Cornell University, 1937

Foster, Mary D., Lecturer, Part-Time, Music. B.A., Oberlin College, 1953; M.M., University of Illinois, 1956

Foster, Phillips W., Professor, Agricultural and Resource Economics. B.S., Cornell University, 1953; M.S., University of Illinois (Urbana), 1956; Ph.D., 1958.

Fourney, William L., Professor Mechanical Engineering. B.S.A.E., West Virginia University, 1962; M.S., 1963; Ph.D., University of Illinois (Urbana), 1966

Foust, Clifford M., Professor, History. B.A., Syracuse University, 1949; M.A., University of Chicago, 1951; Ph.D., 1959

Fraley, Lester M., Professor Emeritus, Physical Education, Dean Emeritus, College of Physical Education, Recreation and Health. A.B., Randolph-Macon College, 1928; M.A., Peabody College, 1937; Ph.D., 1939.

Frank, Diane, Assistant Professor, Dance. B.F.A., Ohio University, 1969; M.A., University of Illinois (Urbana), 1972.

Franz, Jacob, Assistant Professor, Sociology. B.A., Southwestern State College, 1935; M.A., Columbia University, 1939; Ph.D., Ohio State University, 1959.

Freedman, Morris, Professor, English. B.A., City University of New York (City College), 1941; M.A., Columbia University, 1950; Ph.D., 1953

Freeman, David H., Professor, Chemistry. B.S., University of Rochester, 1952; M.S., Carnegie Institute of Technology, 1954; Ph.D., Massachusetts Institute of Technology, 1957.

Freeman, Robert, Associate Professor, Psychology. B.A., Haverford College, 1951; M.A., Wesleyan College, 1954; Ph.D., University of Maryland, 1964.

Freimuth, Vicki S., Assistant Professor, Speech and Dramatic Art and Secondary Education. B.S., Eastern Illinois University, 1966; M.A., University of Iowa, 1967; Ph.D., Florida State University, 1974

Freivogel, David C., Instructor, Dance. A.B., Washington University (Missouri), 1958.

Fretz, Bruce R., Professor, Psychology. B.A., Gettysburg College, 1961; M.A., Ohio State University, 1963; Ph.D., 1965.

Freundschuh, Joy A., Assistant Professor, Physical Education. B.S., University of Alabama, 1953; M.A., 1954

Friedman, Herbert, Professor, Part-Time, Physics and Astronomy. B.A., City University of New York (Brooklyn College), 1936; Ph.D., Johns Hopkins University, 1940.

Fritz, Sigmund, Lecturer, Part-Time, Meteorology. B.S., Brooklyn College, 1934; M.S., Massachusetts Institute of Technology, 1941; Sc.D., 1953.

Fromovitz, Stan, Associate Professor, College of Business and Management. B.A.Sc., University of Toronto, 1960; M.A., 1961; Ph.D., Stanford University, 1965.

Fry, Gladys-Marie, Associate Professor, English. B.A., Howard University, 1952; M.A., 1954; Ph.D., Indiana University, 1967.

Fry, William T., Lecturer, Part-Time, Physical Education. B.S., University of Maryland, 1951.

Fullenwider, Donald R., Assistant Professor, School of Architecture. B.Arch., University of Houston, 1969; M.Arch., University of California (Los Angeles), 1972.

Funaro, George J., Associate Professor, Secondary Education, Provost, Division of Human and Community Resources. B.S., American International College, 1956; M.A., 1956; Ph.D., University of Connecticut, 1965.

Funt, Richard C., Assistant Professor, Horticulture. B.S., Delaware Valley College, 1968; M.S., Pennsylvania State University, 1971; Ph.D., 1974

Gallagher, Charles C., Associate Professor, Music. B.Mus., University of Michigan, 1950; M.Mus., 1952.

Gallagher, Daniel J., Instructor, Economics. B.A., LaSalle College, 1964; M.A., Ohio University, 1967.

Gallman, Philip G., Assistant Professor, Electrical Engineering. B.E., Yale University, 1964; M.S., 1966; M.Phil., 1968; Ph.D., 1971.

Galloway, Raymond A., Professor, Botany. B.S., University of Maryland, 1952; M.S., 1956; Ph.D., 1958.

Gamble, Mary W., Instructor, Chemistry. B.A., Chatham College, 1940; M.S., Pennsylvania State University, 1943.

Gammon, R. W., Assistant Professor, Institute for Molecular Physics. A.B., Johns Hopkins University, 1961; M.S., California Institute of Technology, 1963, Ph.D., Johns Hopkins University, 1967

Gannon, John D., Assistant Professor, Computer Science. A.B., Brown University, 1970; M.S., 1972, Ph.D., University of Toronto, 1975

Gannon, Martin J., Professor, College of Business and Management. B.A., University of Scranton, 1961; Ph.D., Columbia University, 1969.

Gantt, Walter N., Associate Professor, Early Childhood Elementary Education. B.S., Coppin State College, 1942; M.A., New York University, 1956; Ed.D., University of Maryland, 1968.

Garbanati, Dennis A., Assistant Professor, Mathematics. B.A., Spring Hill University, 1967; M.A., University of California (Santa Barbara), 1969; Ph.D., 1972.

Garber, Daniel L., Jr., Associate Professor, Civil Engineering. B.S., University of Maryland, 1952; M.S., 1959, Ph.D., 1964.

Garbuny, Siegfried, Lecturer, Part-Time, College of Business and Menegement. Arb., Schiller Realgymnasium (Berlin), 1933; M.A., University of Berlin, 1936; Ph.D., University of Freiburg (Germany), 1938

Garcia, J. Daniel, Instructor, Spanish and Portuguese. B.A., Cleveland State University, 1969; M.A., University of Maryland, 1972.

Gardner, Albert H., Associate Professor, Institute for Child Study. B.S., State University of New York (Cortland), 1958; M.A., Syracuse University, 1964; Ph.D., 1967.

Gardner, Jerry Y., Assistant Professor, Music. B.Mus., University of Michigen, 1965; M.Mus., Boston University, 1967.

Gardner, Marjorie H., Professor Secondary Education and Chemistry; Associate Dean, College of Education. B.A., University of Utah, 1947; M.A., Ohio State University, 1958; Ph.D., 1960; Ed.D., Utah State University, 1975.

Gardner, Michael R., Assistant Professor, Philosophy. A.B.A., Harvard University, 1949; A.M., 1955; Ph.D., 1957.

Garonzek, Joseph, Lecturer, Part-Time, History. B.A., University of Maryland, 1966; M.A., State University of New York (Stony Brook), 1968; Ph.D., 1974

Garrison, Martha, Assistant Professor, Family and Community Development. B.S., Michigan State University, 1938; M.S., University of Maryland, 1964

Garst, Ronald G., Assistent Professor, Geography. B.S., Arizona State University, 1963; M.A., 1966; Ph.D., Michigan State University, 1972.

Garvey, Evelyn F., Associate Professor, Music. B.S., Temple University, 1943; M.M., University of Rochester, 1946.

Gasner, Larry L., Assistent Professor, Chemical Engineering. B.S., University of Minnesota, 1965; M.S., Massachusetts Institute of Technology, 1967; Ph.D., 1971.

Gass, Saul I., Professor, College of Business and Menegement. B.A., Boston University, 1949; M.A., 1949; Ph.D., University of California (Berkeley), 1965.

Gatz, Margaret J., Assistant Professor, Psychology. B.A., Southwestern University, 1966; Ph.D., Duke University, 1966.

Gauch, Hugh G., Professor Emeritus, Botany. A.B., Miami University (Ohio), 1937; M.S., Kansas State University, 1934; Ph.D., University of Chicago, 1939.

Gaylin, Ned L., Professor and Chairman, Family and Community Development. B.A., University of Chicago, 1956; M.A., 1961; Ph.D., 1965.

Gelman, Ellen F., Assistant Professor, Art. A.B., Brandeis University, 1961; M.F.A., Columbia University, 1964

Gelso, Charles J., Associate Professor, Psychology. B.S., Bloomburg State College, 1963; M.S., Florida State University, 1964; Ph.D., Ohio State University, 1970.

Gemmill, Perry R., Instructor, Industrial Education. B.S., Millersville State College, 1968; M.A.E., Ball State College, 1970

Genalis, Paris, Lecturer, Part-Time, Aerospace Engineering. B.S.E., University of Michigan, 1963; M.S.E., 1965; Ph.D., 1970

Genovese, Robert, Lecturer, Part-Time, Music.

Gentel, William D., Instructor, Part-Time, Institute of Criminal Justice and Criminology. B.P.S., New Mexico State University, 1969; M.P.A., University of Arizona, 1970; LL.B. Blackstone School of Law, 1972

Gentry, James W., Associate Professor, Chemical Engineering. B.S., Oklahoma State University, 1961; M.S., University of Birmingham, 1963; Ph.D., University of Texas, 1969

Geraci, Philip C., Assistant Professor, College of Journalism. B.S., University of Maryland, 1953; M.A., 1961.

Gerbert, Elaine T., Lecturer, Oriental and Hebrew Program. B.A., University of California (Berkeley), 1966; M.A., University of Chicago, 1971

Gianfrancesco, Frank D., Instructor, Economics. B.A., Boston College, 1970; M.A., University of Maryland, 1972

Giblette, John F., Professor and Chairman, Measurement and Statistics. B.A., George Washington University, 1947; M.A., University of Minnesota, 1952; Ph.D., University of Pennsylvania, 1960.

Giblin, Michael J., Instructor, Industrial Education. B.A., San Diego State College, 1972; M.A., Ball Steta University, 1973.

Giffin, Donald W., Associate Professor, History; Director of Admissions and Registrations. B.A., University of California (Santa Barbara), 1950; M.A., Venderbilt University, 1956, Ph.D., 1962.

Gilbert, Claire P., Assistant Professor, Franch and Italian. B.A., Rice University, 1960; M.A., University of Deleware, 1963; Ph.D., Johns Hopkins University, 1969.

Gilbert, James B., Professor, History. B.A., Carleton College, 1961; M.A., University of Wisconsin (Platteville), 1963; Ph.D., 1966.

Gill, Douglas E., Assistant Professor, Zoology. B.S., Marietta College, 1965; M.A., University of Michigan, 1967, Ph.D., 1971.

Gillen, Dennis J., Lecturer, College of Business and Management. B.S., University of Maryland, 1971; M.B.A., 1973.

Ginter, Marshall L., Professor, Institute for Molecular Physics. A.B., Chico State College, 1958; Ph.D., Vanderbilt University, 1961.

Girdano, Daniel A., Associate Professor, Health Education. B.A., West Liberty State College, 1964; M.A., Kent State University, 1965; Ph.D., University of Toledo, 1970

Girdano, Dorothy B., Associate Professor, Health Education. B.S., University of Nebraska, 1960; M.A., Colorado State College, 1964; Ph.D., University of Toledo, 1969

Glass, James M., Associate Professor, Government and Politics. B.A., University of California (Berkeley), 1961; M.A., 1964; Ph.D., 1970

Glasser, Robert G., Professor, Physics and Astronomy. A.B., University of Chicago, 1948; B.S., 1950; M.S., 1952; Ph.D., 1954.

Glee, Ulysses S., Instructor, Part-Time, Agricultural and Extension Education. B.S., Florida Agricultural and Mechanical University, 1967; M.S., University of Maryland, 1970.

Glendening, Parris N., Associate Professor, Government and Politics. B.A., Florida State University, 1964; M.A., 1965; Ph.D., 1967.

Glick, Arnold J., Associate Professor, Physics and Astronomy. B.A., City University of New York (Brooklyn), 1955; Ph.D., University of Maryland, 1961.

Gloeckler, George, Associate Professor, Physics and Astronomy. S.B., University of Chicago, 1960; S.M., 1962; Ph.D., 1965.

Glosser, Robert, Associate Professor, Physics and Astronomy. S.B., Massachusetts Institute of Technology, 1959; S.M., University of Chicago, 1962; Ph.D., 1967.

Glover, Rolfe E., III., Professor, Physics and Astronomy. A.B. Bowdoin College, 1948; B.S., Massachusetts Institute of Technology, 1948; Ph.D., University of Goettingen, 1953

Gluckstern, Robert L., Professor Physics and Astronomy, Chancellor. B.E.E., City University of New York (City College), 1944; Ph.D., Massachusetts Institute of Technology, 1948.

Goering, Jacob D., Professor, Institute for Child Study. B.S., Bethel College, 1941; Ph.D., University of Maryland, 1959

Goff, Regina M., Professor, Early Childhood Elementery Education. B.S., Northwestern University, 1931; M.A., Columbia University, 1940; Ph.D., 1948

Gold, Edward S., Instructor, English. B.A., University of Maryland, 1969; M.A., Johns Hopkins University, 1970

Goldberg, Jeffrey L., Lecturer, Part-Time, Music. B.M. Peabody Conservetory, 1972; M.M., Catholic University of America, 1973

Goldberg, Seymour, Professor, Mathematics. A.B., Hunter College, 1950; M.A., Ohio State University, 1952; Ph.D., 1958.

Goldenbaum, George C., Associate Professor, Physics and Astronomy. B.S., Muhlenberg College, 1957; Ph.D., University of Maryland, 1966

Goldfinger, Iris Z., Lecturer, Part-Time, Special Education. B.S., Russell Sage College, 1968; M.Ed., University of Maryland, 1971

Goldhaber, Jacob K., Professor and Chairman, Mathematics. B.A., City University of New York (Brooklyn College), 1944; M.A., Harvard University, 1945; Ph.D., University of Wisconsin, 1950

Golding, Edwin I., Lecturer, Part-Time, Information Systems Menegement. B.S., United Stetes Naval Academy, 1950; M.S.E., University of Michigan, 1955; Ph.D., 1962.

Goldman, David T., Professor, Part-Time, Chemical Engineering. B.A., Brooklyn College, 1952; M.S., Vanderbilt University, 1954; Ph.D., University of Maryland, 1958.

Goldman, Harvey, Associate Professor, Administration, Supervision and Curriculum. Bach., University of Rhode Island, 1960; Ed.D., Michigan State University, 1968

Goldsby, Richard A., Professor, Chemistry. B.A., University of Kansas, 1957; Ph.D., University of California (Berkeley), 1961.

Goldsmith, Nancy A., Instructor, Early Childhood Elementary Education. B.S., State University College, 1964; M.Ed., University of Maryland, 1968

Goldstein, Irwin L., Professor, Psychology. B.B.A., City University of New York (City College), 1959; M.A., University of Maryland, 1962; Ph.D., 1964

Goldstein, Larry J., Professor, Mathematics. B.A., University of Pennsylvania, 1965; Ph.D., Princeton University, 1967

Gollub, Lewis R., Professor, Psychology. A.B., University of Pennsylvania, 1955; Ph.D., Harvard University, 1958

Gomezplata, Albert, Professor and Chairmen, Chemical Engineering. B.Ch.E., Polytechnic Institute of Brooklyn, 1952; M.Ch.E., 1954; Ph.D., Rennsaleer Polytechnic Institute, 1959

Good, Richard A., Professor, Mathematics. A.B., Ashland College, 1939; M.A., University of Wisconsin, 1940; Ph.D., 1945

Goode, M. Dennis, Associate Professor, Zoology. B.S., University of Kansas, 1963; Ph.D., Iowa State University, 1967.

Goodin, Robert E., Assistant Professor, Government and Politics. B.A., Indiana University, 1972; D.Phil., Oxford University (England), 1975.

Goodrich, Andrew L., Assistent Professor, Administration, Supervision and Curriculum; Director, Office of Minority Student Education. B.S., Tennessee State University, 1950; M.S., 1957; Ph.D., Michigan State University, 1969

Goodwin, Edwin E., Extension Associate Professor, Animal Science. B.S., Louisiana State University, 1946; M.S., Cornell University, 1948; Ph.D., Washington State University, 1955.

Goodwyn, Frank, Professor, Spanish and Portuguese. B.A., College of Arts and Industries, 1939; M.A., 1940; Ph.D., University of Texas, 1946

Gordon, Donald C., Professor, History. B.A., College of William and Mary, 1934; M.A., Columbia University, 1937; Ph.D., 1947.

Gordon, Glen E., Professor, Chemistry. B.S., University of Illinois (Urbana), 1956; Ph.D., University of California (Berkeley), 1960.

Gordon, Stewart L., Professor, Music. B.A., University of Kansas, 1953; M.A., 1954; D.M.A., University of Rochester, 1965.

Gorgacz, Edward J., Assistent Professor, Veterinary Science. V.M.D., University of Pennsylvania, 1967; Ph.D., University of Connecticut, 1974

Gorovitz, S., Professor and Chairman, Philosophy. B.S., Massachusetts Institute of Technology, 1960; Ph.D., Stanford University, 1963

Gouin, Francis R., Associate Professor, Horticulture. B.S., University of New Hampshire, 1962; M.S., University of Maryland, 1965; Ph.D., 1969

Gould, Murray J., Assistent Professor, Music. B.Mus., Menhattan School of Music, 1957; M.Mus., 1958; Ph.D., New York University, 1973.

Gowdy, R. H., Assistant Professor, Physics and Astronomy. B.S., Worcester Polytechnic Institute, 1963; M.S., Yale University, 1964; Ph.D., 1968

Graham, Ethel L., Instructor, Part-Time, Food, Nutrition and Institution Administration. B.S., Drexel Institute of Technology, 1961; M.S., University of Maryland, 1964

Gramberg, Edward J., Professor, Spanish and Portuguese. B.A., University of Amsterdam, 1946; M.A., University of California (Berkeley), 1949; Ph.D., 1956

Grambs, Jean D., Professor, Secondary Education. B.A., Reed College, 1940; M.A., Stanford University, 1941; Ed.D., 1948.

Gramling, Lawrence J., Lecturer, College of Business and Management. B.S., University of Scranton, 1968; M.B.A., Northeastern University, 1970

Grant, Lee P., Assistent Professor, Agricultural Engineering. B.S., University of Connecticut, 1962; M.S., Pennsylvania State University, 1971; Ph.D., 1974

Gravely, William H., Jr., Professor Emeritus, English. B.A., College of William and Mary, 1925; Ph.D., University of Virginia, 1953.

Graves, Clifford W., Lecturer, Part-Time, Institute of Urban Studies. B.A., University of California (Berkeley), M.C.P. 1964

Gray, Alfred, Professor, Mathematics. B.A., University of Kansas, 1960; M.A., 1961; Ph.D., University of California (Los Angeles), 1964.

Grazer, William F., Lecturer, College of Business and Management. B.A., Saint Bernard College, 1964; M.B.A., University of Maryland, 1971.

Green, Eleanor B., Assistant Professor, Art. B.A., Vassar College, 1949; M.A., George Washington University, 1971; Ph.D., 1973.

Green, Harry B., Assistant Professor, Institute for Child Study. B.A., University of Virginia, 1959; M.Ed., 1963; Ph.D., 1965.

Green, Paul S., Associate Professor, Mathematics. B.A., Cornell University, 1959; M.A., Harvard University, 1960; Ph.D., Cornell University, 1964.

Green, Robert L., Professor, Agricultural Engineering, Acting Director, Agricultural Experiment Station; Coordinator, Water Resources Research Center. B.S.A.E., University of Georgia, 1934; M.S., State College of Iowa, 1939; Ph.D., Michigan State University, 1953.

Green, Willard W., Professor, Animal Science. B.S., University of Minnesota, 1933; M.S., 1934; Ph.D., 1939.

Greenberg, James D., Assistant Professor, Office of Laboratory Experiences. A.B., Brown University, 1964; M.A., University of Connecticut, 1966; Ph.D., 1969.

Greenberg, Kenneth R., Associate Professor, Counseling and Personnel Services. B.S., Ohio State University, 1951; M.A., 1952; Ph.D., Case-Western Reserve University, 1960.

Greenberg, Leon, Professor, Mathematics. B.S., City University of New York (City College), 1953; M.A., Yale University, 1955; Ph.D., 1958.

Greenberg, Louis M., Associate Professor, History. A.B., City University of New York (Brooklyn College), 1954; M.A., Harvard University, 1957; Ph.D., 1963.

Greenberg, Meyer, Assistant Professor and Director, Part-Time, Hebrew Program. B.A., Yeshiva University, 1934; M.A., Jewish Institute of Religion, 1944; Ph.D., University of Maryland, 1956.

Greenberg, Oscar W., Professor, Physics and Astronomy. B.S., Rutgers — The State University, 1952; A.M., Princeton University, 1954; Ph.D., 1956.

Greenwald, Andrew E., Lecturer, Part-Time, Family and Community Development. B.S., University of Wisconsin, 1964; J.D., Georgetown University, 1967.

Greenwood, David C., Associate Professor, English. B.A., University of London, 1949; Ph.D., University of Dublin, 1968.

Greenwood, Stuart W., Instructor, Aerospace Engineering. B.Sc., Bristol University, 1945; M.Eng., McGill University, 1952.

Greer, Thomas V., Professor, College of Business and Management. B.A., University of Texas, 1953; M.B.A., Ohio State University, 1957; Ph.D., University of Texas, 1964.

Greisman, Harvey C., Assistant Professor, Sociology. B.A., State University of New York (New Paltz), 1966; M.A., Syracuse University, 1969; Ph.D., 1972.

Grentzer, Rose M., Professor Emerita, Music. A.B., Carnegie Institute of Technology, 1935; A.B., 1936; M.A., 1939.

Griem, Hans, Professor, Physics and Astronomy. Bach., Max Planck Schule, 1949; Ph.D., University of Kiel, 1954.

Grieves, Robin H., Instructor, Economics. B.S., Ohio State University, 1969; M.A., University of Maryland, 1973.

Griffin, James J., Professor, Physics and Astronomy. B.S., Villanova College, 1952; M.S., Princeton University, 1955; Ph.D., 1956.

Griffiths, Thomas J., Instructor, Physical Education. B.S., Southern Connecticut State College, 1971; M.A., University of Maryland, 1973.

Grigg, Barbara J., Instructor, Botany. B.S., Florida Southern College, 1960; M.S., University of Tennessee, 1963; Ph.D., Duke University, 1968.

Grim, Samuel D., Professor, Chemistry. B.S., Franklin and Marshall College, 1956; Ph.D., Massachusetts Institute of Technology, 1960.

Grimshaw, Alan E., Lecturer, College of Business and Management. B.S., Northern Illinois University, 1963; M.B.A., 1970.

Grimsted, David A., Associate Professor, History. A.B., Harvard University, 1957; M.A., University of California (Berkeley), 1958; Ph.D., 1963.

Grollman, Sigmund, Professor, Zoology. B.S., University of Maryland, 1947; M.S., 1949; Ph.D., 1952.

Groves, Paul A., Assistant Professor, Geography. B.S., University of London, 1956; Ph.D., University of California (Berkeley), 1969.

Gruber, Arnold, Lecturer, Part-Time, Meteorology. B.S., Brooklyn College, 1962; M.S., Florida State University, 1964; Ph.D., 1968.

Gruchy, Allan G., Professor and Acting Chairman, Economics. B.A., University of British Columbia, 1926; M.A., McGill University, 1928; Ph.D., University of Virginia, 1931.

Gruenebaum, Fred M., Lecturer, Part-Time, Music. Dipl., Curtis Institute of Music, 1962.

Grumbach, Doris, Visiting Professor, Part-Time, English. B.A., New York University, 1939; M.A., Cornell University, 1940; Ph.D., Columbia University, 1946.

Grunig, James E., Associate Professor, College of Journalism. B.S., Iowa State University, 1964; M.S., University of Wisconsin, 1966; Ph.D., 1968.

Gruzalski, Bart K., Instructor, Part-Time, Philosophy. B.A., Western Illinois University, 1964; M.A., University of Maryland, 1972; Ph.D., 1974.

Guernsey, Ralph L., Research Associate Professor, Institute for Fluid Dynamics and Applied Mathematics. B.S., Miami University (Ohio), 1952; Ph.D., University of Michigan, 1960.

Guillory, John U., Assistant Professor, Physics and Astronomy. B.A., Rice University, 1962; Ph.D., University of California (Berkeley), 1970.

Gulick, Sidney L., III., Professor, Mathematics. B.A., Oberlin College, 1958; M.A., Yale University, 1960; Ph.D., 1963.

Gunn, Arthur C., Lecturer, Part-Time, College of Library and Information Services. B.S., Wilberforce University, 1964; M.S.L.S., Atlantic University, 1969.

Gustafson, Gerald C., Lecturer and Director, Air Force Aerospace Studies Program. B.A., Park College, 1967; M.I.A., George Washington University, 1972.

Gustrafson, Forest V., Instructor, Part-Time, Recreation. B.S., University of Minnesota, 1933; M.S., 1940.

Haber, Francis C., Professor, History. B.A., University of Connecticut, 1948; M.A., Johns Hopkins University, 1952; Ph.D., 1957.

Hacklander, Effie, Assistant Professor, Textiles and Consumer Economics. B.S., University of Minnesota, 1962; M.S., Michigan State University, 1968; Ph.D., 1973.

Hagerty, Patrick E., Assistant Professor, Computer Science. B.A., Syracuse University, 1960; B.E.E., 1961; M.S., 1967; Ph.D., 1969.

Hagner, Jutta, Lecturer, Part-Time, Family and Community Development. B.A., University of Maryland, 1972.

Hahn, Oscar, Instructor, Spanish and Portuguese. M.A., University of Iowa, 1972.

Hahnel, Robin E., Instructor, Economics. B.A., Harvard University, 1968.

Haigh, Barbara J., Lecturer, Part-Time, Special Education. B.A., University of Maryland, 1966; M.Ed., 1970.

Haley, A. James., Professor and Assistant Chairman, Zoology. B.S., University of New Hampshire, 1949; M.S., 1950; Sc.D., Johns Hopkins University, 1955.

Haley, Kathleen A., Assistant Professor, Music. B.Mus., Michigan State University, 1949; M.Mus., 1951; D.M.A., University of Michigan, 1964.

Hall, Florence E., Instructor, Secondary Education. B.S., Drexel Institute of Technology, 1966.

Hall, Jerome W., Associate Professor, Civil Engineering. B.S., Harvey Mudd College, 1965; M.S., University of Washington, 1968; Ph.D., 1969.

Hall, John R., Assistant Professor, Agronomy. B.S., University of Illinois (Urbana), 1964; M.A., 1965; Ph.D., Ohio State University, 1971.

Hall, Thomas W., Associate Professor, French and Italian. B.A., University of Maryland, 1938; M.A., Middlebury College, 1950; Ph.D., University of Maryland, 1958.

Hamilton, Arthur B., Associate Professor Emeritus, Agricultural Engineering. B.S., University of Maryland, 1929; M.S., 1931.

Hamilton, Donna B., Assistant Professor, English. B.A., Saint Olaf College, 1963; Ph.D., University of Wisconsin, 1968.

Hamilton, Gary D., Associate Professor, English. B.A., Saint Olaf College, 1962; M.A., University of Wisconsin, 1965; Ph.D., 1968.

Hamlet, Richard G., Assistant Professor, Computer Science. B.S., University of Wisconsin, 1959; M.S., Cornell University, 1964; Ph.D., University of Washington, 1971.

Hamlet, Sandra L., Associate Professor, Hearing and Speech Sciences. B.A., University of Wisconsin, 1959; M.A., 1967; Ph.D., University of Washington, 1970.

Hammer, D. A., Visiting Associate Professor, Part-Time, Physics and Astronomy. B.S., California Institute of Technology, 1964; Ph.D., Cornell University, 1969.

Hammer, Judith A., Assistant to the Provost for Student Advisement, Division of Behavioral and Social Sciences. B.A., University of Maryland, 1968; M.A., 1971.

Hammond, Robert C., Professor and Chairman, Veterinary Science. B.S., Pennsylvania State University, 1943; V.M.D., University of Pennsylvania, 1948.

Handsman, Russell G., Lecturer, Anthropology. B.A., Franklin and Marshall College, 1970.

Hansen, J. Norman, Associate Professor, Chemistry. B.A., Drake University, 1964; Ph.D., University of California (Los Angeles), 1968.

Haralambous, Sappho, Instructor, Part-Time, English. B.A., Western College, 1970.

Harber, Jean R., Assistant Professor, Special Education. B.A., Ohio State University, 1961; M.Ed., University of Pittsburgh, 1972; Ph.D., 1975.

Hardgrave, Walter T., Assistant Professor, Information Systems Management. B.S., University of Texas (Austin), 1967; M.A., 1970; Ph.D., 1972.

Hardie, Ian W., Associate Professor, Agricultural and Resource Economics. B.S., University of California (Davis), 1960; Ph.D., University of California (Berkeley), 1965.

Harding, Elizabeth J., Instructor, Part-Time, English. B.A., Mount Mercy College, 1969; M.S., University of Maryland, 1971.

Harding, Wallace C., Jr., Principal Specialist, Entomology. B.S., University of Maryland, 1951; M.S., 1956; Ph.D., 1961.

Hardwick, Mark W., Assistant Professor, Counseling and Personnel Services. B.A., Michigan State University, 1966; M.A., 1967; Ph.D., 1970.

Hardy, Robert, Associate Professor, Institute for Child Study. B.S.Ed., Bucknell University, 1961; M.S.Ed., Indiana University, 1964; Ed.D., 1969.

Harger, Robert O., Professor and Chairman, Electrical Engineering. B.S., University of Michigan, 1955; M.S., 1959; Ph.D., 1961.

Hargrove, Michael B., Assistant Professor, College of Business and Management. B.S., University of Kentucky, 1963; M.A., 1966; Ph.D., 1971.

Harlan, Louis R., Professor, History. B.A., Emory University, 1943; M.A., Vanderbilt University, 1948; Ph.D., Johns Hopkins University, 1955.

Harman, Susan E., Professor Emerita, English. B.A., University of Nebraska, 1917; M.A., 1918; Ph.D., Johns Hopkins University, 1926.

Harper, Glenn, Assistant Professor, Sociology. B.S., Purdue University, 1958; M.S., 1961; Ph.D., 1968.

Harper, Robert A., Professor and Chairman, Geography. Ph.B., University of Chicago, 1946; S.B., 1947; S.M., 1948; Ph.D., 1950.

Harrington, J. P., Associate Professor, Physics and Astronomy. B.S., University of Chicago, 1961; M.S., Ohio State University, 1964; Ph.D., 1967.

Harris, Curtis C., Professor, Economics, Research Associate, Bureau of Business and Economic Research. B.S., University of Florida, 1956; M.A., Harvard University, 1959; Ph.D., 1960.

Harris, James F., Assistant Professor, History. B.S., Loyola University, 1962; M.S., University of Wisconsin, 1964; Ph.D., 1968.

Harris, Joan R., Lecturer, Part-Time, Afro-American Studies. B.A., California State University (Los Angeles), 1962; M.A., 1965; Ph.D., Brandeis University, 1975.

Harris, Wesley L., Professor and Chairman, Agricultural Engineering. B.S.A.E., University of Georgia, 1953; M.S., 1958; Ph.D., Michigan State University, 1960.

Harrison, Floyd P., Professor, Entomology. B.S., Louisiana State University, 1951; M.S., 1953; Ph.D., University of Maryland, 1955.

Harrison, George K., Assistant Professor, Botany. B.A., Western Maryland College, 1935; M.S., University of Maryland, 1956; Ph.D., 1958.

Harrison, Horace V., Professor, Government and Politics. B.A., Trinity University (Texas), 1932; M.A., University of Texas, 1941; Ph.D., 1951.

Harrison, Paul E., Jr., Professor, Industrial Education. B.S.D., Northern Illinois University, 1942; M.A., Colorado State College, 1947; Ph.D., University of Maryland, 1955.

Harvey, James W., Lecturer, College of Business and Management. B.S., University of Illinois (Urbana), 1966; M.B.A., University of Miami (Coral Gables), 1968.

Hasenauer, Edward J., Lecturer, Speech and Dramatic Art. B.A., Iona College, 1971.

Haslem, John A., Associate Professor and Assistant Dean, College of Business and Management. A.B., Duke University, 1956; M.B.A., University of North Carolina, 1961; Ph.D., 1967.

Hastings, Ken W., Jr., Instructor, Industrial Education. B.S.E.E., University of Maryland, 1965.

Hatch, Randolph T., Assistant Professor, Chemical Engineering. B.S., University of California (Berkeley), 1967, M.S., Massachusetts Institute of Technology, 1969, Ph.D., 1972.

Hatfield, Agnes B., Associate Professor, Institute for Child Study. B.A., University of Denver, 1948, M.A., 1954, Ph.D., 1959

Hathorn, Guy B., Professor, Government and Politics. B.A. University of Mississippi, 1940, M.A., 1942, Ph.D., Duke University, 1950

Haviland, Elizabeth E., Assistant Professor Emerita, Entomology. A.B., Wilmington (Ohio) College, 1923, M.A., Cornell University, 1926, M.S., University of Maryland, 1936, Ph.D., 1945.

Hawes, Douglas T., Assistant Professor, Agronomy. B.S., University of Massachusetts, 1962; M.S., Cornell University, 1965, Ph.D., University of Maryland, 1972.

Hayleck, Charles R., Jr., Associate Professor, Mechanical Engineering. B.S., University of Maryland, 1943, M.S., 1949.

Hayman, Helen S., Instructor, Industrial Education. B.S., University of Maryland, 1971.

Hayward, Raymond W., Professor, Part-Time, Physics and Astronomy. B.S., Iowa State University, 1943, Ph.D., University of California (Berkeley), 1950.

Head, Emerson W., Associate Professor, Music. B.Mus., University of Michigan, 1957, M.Mus., 1961.

Heagney, Eileen M., Assistant Professor, Textiles and Consumer Economics. B.S., Pennsylvania State University, 1941, M.A., Columbia University, 1949.

Heath, James L., III, Associate Professor, Poultry Science. B.S., Louisiana State University, 1963, M.S., 1968, Ph.D., 1970.

Hebeler, Jean R., Professor, Special Education. B.S., State University of New York (Albany), 1953; M.S., University of Illinois (Urbana), 1956, Ed.D., Syracuse University, 1960

Hecht, Matthew S., Assistant Professor, Computer Science. B.S.E., Case Western Reserve University, 1970, M.S.E., Princeton University, 1971, M.A., 1973, Ph.D., 1973

Heidelbach, Ruth A., Associate Professor, Early Childhood Elementary Education. B.S., University of Maryland, 1949, M.Ed., University of Florida, 1957; Ed.D., Teachers College, Columbia University, 1967.

Heikkinen, Henry W., Assistant Professor, Chemistry and Secondary Education. B.S., Yale University, 1956, M.A., Columbia University, 1962, Ph.D., University of Maryland, 1973.

Heilprin, Lawrence B., Professor, College of Library and Information Services and Computer Science. B.S., University of Pennsylvania, 1928, M.A., 1931, Ph.D., Harvard University, 1941.

Heim, Norman M., Professor, Music. B.M.Ed., University of Evansville, 1951, M.Mus., University of Rochester, 1952; D.M.A., 1962.

Heimpel, Arthur M., Lecturer, Entomology. B.A., Queens College, 1947, M.A., 1948, Ph.D., University of California (Berkeley), 1954

Heins, Conrad P., Jr., Professor, Civil Engineering. B.S., Drexel Institute of Technology, 1960, M.S., Lehigh University, 1962, Ph.D., University of Maryland, 1967.

Heins, Maurice H., Professor, Mathematics. A.B., Harvard University, 1937, A.M., 1939, Ph.D., 1940; A.M., Brown University, 1947.

Heisler, Martin D., Associate Professor, Government and Politics. B.A., University of California (Los Angeles), 1960; M.A., 1962, Ph.D., 1969.

Hellman, John L., Instructor, Entomology. B.S., University of Maryland, 1966, M.S., 1968.

Helm, A. Brian, Lecturer, Part-Time, Administration, Supervision and Curriculum. B.A., University of Michigan, 1969, M.A., University of Maryland, 1975.

Helm, Eugene E., Professor, Music. B.Mu.Ed., Southeastern Louisiana College, 1950; M.Mu.Ed., Louisiana State University, 1955, Ph.D., North Texas State University, 1958

Helms, Lelia B., Assistant Professor, Government and Politics. B.A., Sarah Lawrence College, 1964, M.A., Tufts University, 1966, Ph.D., 1968.

Helz, George R., Assistant Professor, Chemistry. A.B., Princeton University, 1964, Ph.D., Pennsylvania State University, 1971.

Helzer, Garry A., Associate Professor, Mathematics. B.A., Portland State College, 1959, M.A., Northwestern University, 1962, Ph.D., 1964

Hempstead, R. Ross, Lecturer, Part-Time, Administration, Supervision and Curriculum. A.B., University of California (Berkeley), 1962, M.A., 1966, Ph.D., 1968.

Henery-Logan, Kenneth R., Professor, Chemistry. B.S., McGill University, 1942, Ph.D., 1946

Henkel, Ramon E., Associate Professor, Sociology. Ph.B., University of North Dakota, 1958, M.A., University of Wisconsin, 1961, Ph.D., 1967.

Henkelman, James, Associate Professor, Methematics and Secondery Educetion. B.S., Miami University (Ohio), 1954, M.Ed., 1955, Ed.D., Harvard University, 1965.

Hering, Christoph A., Professor, Germanic and Slavic Languages. Ph.D., University of Bonn, 1950

Herman, Harold J., Associate Professor, English. B.A., University of Maryland, 1952; Ph.D., University of Pennsylvania, 1960

Herman, Wayne L., Associate Professor, Early Childhood Elementary Education. B.A., Ursinus College, 1955; M.Ed., Temple University, 1960; Ed.D., 1965.

Herschbach, Dennis R., Assistant Professor, Industriel Education. A.B., San Jose State College, 1960, M.S., University of Illinois (Urbana), 1968, Ph.D., 1972

Hershfield, David M., Lecturer, Part-Time, Geography. B.A., University of California (Los Angeles), 1948, M.A., University of Maryland, 1970, Ph.D., 1972.

Hesse, Michael B., Assistant Professor, College of Journalism. A.B., University of Cincinnati, 1965; M.A., American University, 1967; Ph.D., University of Wisconsin, 1974

Hetrick, Frank M., Professor and Acting Chairman, Microbiology. B.S., Michigan State University, 1954, M.S., University of Maryland, 1960; Ph.D., 1962.

Hickey, Harry E., Assistant Professor, Fire Protection Engineering. B.S., New York University, 1955; M.S., 1960.

Hicks, Eric C., Assistant Professor, French and Italian. B.A., Yale College, 1959, Ph.D., 1965.

Hicks, Margaret, Lecturer, College of Business and Management. B.S., Southern Illinois University, 1967, M.B.A., 1972.

Hicks, Steven W., Lecturer, Air Force Aerospace Studies Program. B.S., Brigham Young University, 1966, M.S.Adm., 1973.

Hiebert, Ray E., Professor and Dean, College of Journalism. B.A., Stanford University, 1954, M.S., Columbia University, 1957; M.A., University of Maryland, 1961; Ph.D., 1962

Higgins, Elizabeth A., Instructor, Botany. B.S., University of Maryland, 1950, M.A., 1969.

Higgins, William J., Assistant Professor, Zoology. B.S., Boston College, 1969, Ph.D., Florida State University, 1973.

Higgins, William M., Jr., Instructor, Part-Time, Industrial Education. B.S., University of Maryland, 1959

Highton, Richard, Professor, Zoology. B.A., New York University, 1950; M.S., University of Florida, 1953; M.A., 1956

Hildenbrand, Richard E., Instructor, Mathematics. B.S., State University of NewYork (Albany), 1964, M.S., University of Notre Dame, 1968

Hill, Clara E., Assistant Professor, Psychology. B.A., Southern Illinois University, 1970, M.A., 1972, Ph.D., 1974

Hill, D. G., Assistant Professor, Physics and Astronomy. B.S., Carnegie-Mellon University, 1959, M.S., 1960, Ph.D., 1964

Hill, John W., Professor and Dean, School of Architecture. B.A., Rice University, 1951; B.Arch., 1952, M.Arch., University of Pennsylvania, 1959.

Hill, Kathy J., Assistant Professor, Early Childhood Elementary Education. B.A., State University College of New York (Fredonia), 1964, M.Ed., State University of New York (Buffalo), 1970, Ed.D., 1975.

Hill, Walter L., Assistant Professor, Mathematics. B.A., University of California (Berkeley), 1965, M.A., 1967, Ph.D., 1970.

Hillerman, Barbara, Instructor, Housing and Applied Design. B.S., University of Maryland, 1956, M.S., 1972

Hinderer, Walter H., Professor and Acting Chairman, Germanic and Slavic Languages. Ph.D., University of Munich, 1960.

Hirzel, Robert K., Associate Professor, Sociology. B.A., Pennsylvania State University, 1946, M.A., 1950, Ph.D., Louisiana State University, 1954

Hitchcock, Donald R., Associate Professor, Germanic and Slavic Languages. B.A., University of Maryland, 1952, M.A., Harvard University, 1954, Ph.D., 1965.

Hochuli, Urs E., Professor, Electrical Engineering. M.S., University of Maryland, 1955, Ph.D., Catholic University of America, 1962

Hodos, William, Professor, Psychology. B.S., City University of New York (Brooklyn College), 1955, M.A., University of Pennsylvania, 1957, Ph.D., 1960.

Hoecker, Harold H., Associate Professor, Agricultural and Resource Economics. B.S., Iowa State University (Ames), 1941

Hoffman, Bernard G., Associate Professor, Anthropology. B.A., University of Montana, 1946, Ph.D., University of California (Berkeley), 1955

Hoffman, John D., Professor, Part-Time, Chemical Engineering. B.S., Franklin and Marshall College, 1942, M.S., Princeton University, 1948, Ph.D., 1949

Hoffman, Ronald, Associate Professor, History. B.A., George Peabody College, 1964, M.A., University of Wisconsin, 1965, Ph.D., 1969

Hoffsommer, Harold C., Professor Emeritus, Sociology. B.A., Northwestern University, 1921, M.A., 1923; Ph.D., Cornell University, 1929

Holmberg, Stevan R., Assistant Professor and Director of Graduate Studies, College of Business and Management. B.S., University of Tulsa, 1966, M.B.A., Indiana University, 1968, D.B.A., 1971

Holdaway, P. K., Assistent Professor, Dairy Science. B.S., Brigham Young University, 1966, M.S., 1969, Ph.D., Ohio State University, 1973

Holloway, David C., Associate Professor, Mechanical Engineering. B.S., University of Illinois (Urbana), 1966, M.S., 1969, Ph.D., 1971

Holmgren, Harry D., Professor, Physics and Astronomy. B.S., University of Minnesota, 1949, M.A., 1950, Ph.D., 1954

Holmlund, Chester E., Professor, Chemistry. B.S., Worcester Polytechnic Institute, 1943, M.S., University of Wisconsin, 1951, Ph.D., 1954

Holton, W. Milne, Associate Professor, English. B.A., Dartmouth College, 1954, LL.B., Harvard University, 1957, M.A., Yale University, 1959, Ph.D., 1965.

Holum, Kenneth, Assistent Professor, History. B.A., Augustane College, 1961, M.A., University of Chicago, 1969, Ph.D., 1973

Holvey, Samuel B., Assistant Professor, Housing and Applied Design. B.F.A., Syracuse University, 1967, M.A., American University, 1969

Hommel, William L., Lecturer, Art. B.A., Catholic University of America, 1963

Hopkins, H. Palmer, Assistant Professor, Agriculturel and Extension Education; Director of Student Aid. B.S., Oklahome State University, 1936, Ed.M., University of Maryland, 1948, Ed.D., George Washington University, 1962

Hopkins, Richard L., Associate Professor, Social Foundations of Education. B.S., Stanford University, 1962, M.S., 1963, Ph.D., University of California (Los Angeles), 1969

Hornbake, R. Lee, Vice President for Academic Affairs. B.S., California State College (Pennsylvania), 1934, M.A., Ohio State University, 1936, Ph.D., 1942, LL.D., Eastern Michigan University, 1963

Hornung, Carlton A., Assistant Professor, Sociology. B.A., State University of New York (Buffalo), 1967, M.A., Syracuse University, 1970; Ph.D., 1972

Hornyak, William F., Professor, Physics and Astronomy. B.S., City University of New York (City College), 1944, Ph.D., California Institute of Technology, 1949

Horton, David L., Professor, Psychology. B.A., University of Minnesota, 1955, M.A., 1957, Ph.D., 1959

Horton, Gary M., Associate Professor, Music. B.M., Oklahoma Baptist University, 1959, M.M., University of Louisville, 1962

Horvath, John M., Professor, Mathematics. Ph.D., University of Budapest, 1947.

Hotchkiss, Joyce M., Instructor, Part-Time, English. B.A., Douglass College, 1968, M.A., University of Maryland, 1972

Houppert, Joseph W., Associate Professor, English. Ph.B., University of Detroit, 1955, M.A., University of Michigan, 1957, Ph.D., 1964

Hourihan, John J., Visiting Assistant Professor, Anthropology. B.A., University of Maryland, 1969, M.A., 1971, Ph.D., University of Massachusetts, 1975.

Hovey, Richard B., Professor, English. B.A., University of Cincinnati, 1942, M.A., Harvard University, 1943, Ph.D., 1950

Howard, John D., Associate Professor, English. B.A., Washington College (Maryland), 1956, M.A., University of Maryland, 1962, Ph.D., 1967

Howard, Lawrence V., Assistant Professor, Microbiology. B.A., Emory University, 1963, M.S., University of North Carolina, 1966, Ph.D., 1970

Howard, Stephen G., Instructor, Speech and Dramatic Art. B.A., University of Maryland, 1972, M.A., 1974

Howell, Bernice L., Instructor, Institute of Applied Agriculture. A.B., Augsburg College, 1950

Howell, Grace F., Instructor, Microbiology. B.S., Temple University, 1941

Hoyert, John H., Professor, Agronomy. B.S., University of Maryland, 1943, M.S., 1949, Ph.D., 1951

Hoyt, Kenneth E., Professor, Counseling and Personnel Services. B.S., University of Maryland, 1948, M.A., George Washington University, 1950, Ph.D., University of Minnesota, 1954

Hoyt, Richard D., Assistant Professor, College of Journalism. B.S., University of Oregon, 1963, M.S., 1967, Ph.D., University of Hawaii, 1972

Hrabikova, Helena M., Instructor, Part-Time, French and Italian. Doct., University of Genoa (Italy), 1958

Hsu, Shao T., Professor, Mechanical Engineering. B.S., Chiao-Tung University, 1937; M.S., Massachusetts Institute of Technology, 1944; D.Sc., Swiss Federal Institute of Technology, 1954

Hsueh, Chun-Tu, Professor, Government and Politics. L.L.B., Chaoyang University (China), 1946; M.A., Columbia University, 1953; Ph.D., 1958

Hu, Charles Y., Professor, Geography. B.S., University of Nanking, 1930; M.A., University of California (Berkeley), 1936; Ph.D., University of Chicago, 1941

Hubbard, Bert E., Research Professor, Mathematics and Institute for Fluid Dynamics and Applied Mathematics. B.S., Western Illinois University, 1949; M.S., State University of Iowa, 1952; Ph.D., University of Maryland, 1960

Hubbe, Rolf O., Associate Professor, Classical Langueges and Literatures. B.A., Hamilton College, 1947; M.A., Princeton University, 1950; Ph.D., 1950

Huden, Daniel P., Associate Professor, Social Foundations of Education. B.S., University of Vermont, 1954; M.A., Columbia University, 1958; Ed.D., 1967

Hudson, William L., Professor, Music. B.Mus., Philadelphia Music Academy, 1954; A.B., University of Pennsylvania, 1957; M.Mus., Yale University, 1961

Huebner, Robert W., Associate Professor, Institute for Child Study. B.S., Concordia Teachers College, 1954; M.A., University of Maryland, 1960; Ph.D., 1969

Huheey, James A., Professor, Chemistry. B.S., University of Cincinnati, 1957; M.S., University of Illinois (Urbana), 1959; Ph.D., 1961

Hult, Joan S., Associate Professor, Physical Education. B.S., Indiana University, 1954; M.Ed., University of North Carolina (Greensboro), 1957; Ph.D., University of Southern California, 1967

Hummel, James A., Professor, Mathematics. B.S., California Institute of Technology, 1949; M.A., Rice University, 1953; Ph.D., 1955.

Hummel, John W., Associate Professor, Agricultural Engineering. B.S.A.E., University of Maryland, 1964; M.S., 1966; Ph.D., University of Illinois (Urbana), 1970.

Humphrey, Fred, Professor and Chairman, Recreation. B.A., Rarkio College, 1946; M.A., University of Iowa, 1953; Ph.D., Pennsylvania State University, 1973.

Humphrey, James H., Professor, Physical Education. A.B., Denison University, 1933; M.A., Western Reserve University, 1946; Ed.D., Boston University, 1951

Hune, Shirley, Instructor, Part-Time, American Studies. B.A., University of Toronto, 1966.

Hunt, Edith J., Assistant Professor, Institute for Child Study. A.B., University of Redlands, 1954; M.A., University of Claremont, 1964; Ed.D., University of Maryland, 1967.

Hunt, Janet G., Assistant Professor, Sociology. B.A., University of Redlands, 1962; M.A., Indiana University, 1966; Ph.D., 1973

Hunt, Larry L., Assistant Professor, Sociology. B.S., Ball State University, 1961; M.A., Indiana University, 1964; Ph.D., 1968.

Hunter, Leon, Lecturer, Part-Time, Family and Community Development. B.A., Clark College, 1964; M.S.W., Atlanta University, 1970.

Hurdis, David A., Assistant Professor, Mechanical Engineering. B.S., University of Rhode Island, 1962; M.S., 1964; Ph.D., Catholic University of America, 1973.

Husman, Burris F., Professor and Chairman, Physical Education. B.S., University of Illinois (Urbana), 1941; M.S., 1948; Ed.D., University of Maryland, 1954.

Hutton, Dale J., Associate Professor, School of Architecture. B.Arch., Texas Agricultural and Mechanical University, 1960; M.Arch., Columbia University, 1961.

Hymes, D. L., Lecturer, Part-Time, College of Journalism. A.B., Columbia University, 1953; M.S., 1954.

Hynes, Cecil V., Associate Professor, College of Business and Management. B.A., Michigan State University, 1948; M.A., 1949; Ph.D., 1965.

Igel, Regina, Assistant Professor, Spanish and Portuguese. M.A., State University of Iowa, 1969; Ph.D., University of New Mexico, 1973.

Imberski, Richard B., Associate Professor, Zoology. B.S., University of Rochester, 1959; Ph.D., 1965.

Ingangi, John C., Instructor, Chemistry; Assistant to the Provost, Division of Agricultural and Life Sciences. B.S., University of Maryland, 1964; M.S., 1972.

Ingling, Allen L., Assistant Professor, Veterinary Science. B.S.E.E., University of Maryland, 1963; V.M.D., University of Pennsylvania, 1969

Ingraham, Barton L., Assistant Professor, Institute of Criminal Justice and Criminology. A.B., Harvard University, 1952; J.D., 1957; M.Crim., University of California (Berkeley), 1968; Ph.D., 1971

Ingram, Anne G., Professor, Physical Education. A.B., University of North Carolina, 1944; M.A., University of Georgia, 1948; Ed.D., Columbia University, 1962

Irby, Gary R., Instructor, Housing and Applied Design. B.S., Eastern Illinois University, 1965; M.F.A., George Washington University, 1969

Irwin, George R., Visiting Professor, Part-Time, Mechanical Engineering. A.B., Knox College, 1930; M.S., University of Illinois (Urbana), 1933; Ph.D., 1937

Isaacs, Neil D., Professor, English. A.B., Dartmouth College, 1953; A.M., University of California (Berkeley), 1956; Ph.D., Brown University, 1959.

Ishee, Sidney, Professor, Agricultural and Resource Economics. B.S., Mississippi State University, 1950; M.S., Pennsylvania State University, 1952; Ph.D., 1957

Israel, Gerhard W., Professor, Civil Engineering and Meteorology. Diplom (Physics), University of Heidelberg (Germany), 1962; Ph.D., Technische Hochschule — Aechen, Germany, 1965.

Iwry, Samuel, Professor, Part-Time, Oriental and Hebrew Program. B.A., Teachers' College Vilno, 1931; M.A., Institute for Higher Judaic Studies (Warsaw), 1937; Ph.D., The Johns Hopkins University, 1951

Jachowski, Leo A., Jr., Professor, Zoology. B.S., University of Michigan, 1941; M.S., 1942; Sc.D., The Johns Hopkins University, 1953

Jackson, Elton S., Assistant Professor, Physical Education. B.S., University of Maryland, 1958; M.A., 1966.

Jackson, John W., Professor Emeritus, Mechanical Engineering. B.S., University of Cincinnati, 1934; M.Eng., 1937; M.S., California Institute of Technology, 1940.

Jackson, Stanley B., Professor, Mathematics. B.S., Bates College, 1933; M.A., Harvard University, 1934; Ph.D., 1937.

Jacobs, Walter D., Professor, Government and Politics. B.S., Columbia University, 1955; M.A., 1956; Ph.D., 1961

Jadin, P. Kenneth, Assistant Professor, School of Architecture. B.Arch., University of Oklahoma, 1965; M.Arch., University of Pennsylvania, 1967; M.C.P., 1967

James, Edward F., Assistant Professor, English and Secondary Education. B.A., University of Maryland, 1954; M.A., 1955; Ph.D., The Catholic University of America, 1970.

James, M. Lucia, Professor, Administration, Supervision and Curriculum; Director, Curriculum Laboratory. A.B., North Carolina College, 1945; M.S., University of Illinois, 1949; Ph.D., University of Connecticut, 1963.

Jamieson, Kathleen M., Assistant Professor, Speech and Dramatic Art. B.A., Marquette University, 1967; M.A., University of Wisconsin, 1968; Ph.D., 1972.

Jamieson, Mitchell, Professor, Art. Cert., Corcoran School of Art, 1938.

Jamison, Lawrence D., Assistant Professor, Institute of Criminal Justice and Criminology. B.S., Hampton Institute, 1963; J.D., Howard University, 1969; L.L.M., George Washington University, 1971.

Janes, Robert W., Professor, Sociology and Institute for Urban Studies. A.B., University of Chicago, 1938; M.A., 1939; Ph.D., University of Illinois, 1942

Jantz, Richard K., Assistant Professor, Early Childhood Elementary Education. B.S., Indiana University, 1968; M.S., 1970; Ed.D., Ball State University, 1972.

Jaquith, Richard H., Professor, Chemistry; Assistant Vice Chancellor for Academic Affairs. B.S., University of Massachusetts, 1940; M.S., 1942; Ph.D., Michigan State University, 1955.

Jarvis, Bruce B., Associate Professor, Chemistry. B.A., Ohio Wesleyan University, 1963; Ph.D., University of Colorado, 1966

Jarvis, Richard L., Instructor, Music. B.Mus., West Virginia University, 1953; M.Mus., 1954; M.Mus., New England Conservatory of Music, 1966

Jashemski, Wilhelmina F., Professor, History. B.A., York College, 1931; M.A., University of Nebraska, 1933; Ph.D., University of Chicago, 1942.

Jellema, Roderick H., Associate Professor, English. B.A., Calvin College, 1951; M.A., 1954; Ph.D., University of Edinburgh, 1962.

Johns, Elizabeth B., Assistant Professor, Art. B.A., Birmingham-Southern College, 1959; M.A., University of California (Berkeley), 1965; Ph.D., Emory University, 1974

Johnson, Arthur T., Assistant Professor, Agricultural Engineering. B.S.A.E., Cornell University, 1964; M.S., 1967; Ph.D., 1969.

Johnson, Charles E., Associate Professor, Measurement and Statistics. B.A., University of Minnesota, 1957; Ph.D., 1964

Johnson, Charles R., Assistant Professor, Economics and Institute for Fluid Dynamics and Applied Mathematics. B.A., Northwestern University, 1969; Ph.D., California Institute of Technology, 1972

Johnson, Conrad D., Associate Professor, Philosophy. A.B., Stanford University, 1965; M.A., University of Michigan, 1966; Ph.D., 1969

Johnson, Everett R., Professor, Chemical Engineering. B.A., State University of Iowa, 1937; M.A., Harvard University, 1940; Ph.D., University of Rochester, 1949

Johnson, Janet W., Assistant Professor, Psychology. A.B., George Washington University, 1951; A.M., 1956; Ph.D., 1962

Johnson, Jerry W., Assistant Professor, Agronomy. B.S., University of Georgia, 1970; M.S., Purdue University, 1972; Ph.D., 1974

Johnson, Knowlton W., Assistant Professor, Institute of Criminal Justice and Criminology. B.S., Clemson University, 1964; M.A., Michigan State University, 1969; Ph.D., 1971

Johnson, Martin L., Associate Professor, Early Childhood Elementary Education. B.S., Morris College, 1962; M.Ed., University of Georgia, 1968; Ed.D., 1971

Johnson, Raymond L., Associate Professor, Mathematics. B.A., University of Texas, 1963; Ph.D., Rice University, 1969

Johnson, Robert B., Associate Professor, Veterinary Science. A.B., University of South Dakota, 1939

Johnson, Ronald C., Assistant Professor, Physical Education. B.S., Baylor University, 1957; M.S., 1958; Ed.D., University of Maryland, 1970

Johnson, Roy H., Professor, Music. B.Mus., University of Rochester, 1949; M.Mus., 1951; D.M.A., 1960

Johnson, Warren R., Professor, Health Education. B.A., University of Denver, 1942; M.A., 1947; Ed.D., Boston University, 1950.

Jolson, Marvin A., Assistant Professor, College of Business and Management. B.E.E., George Washington University, 1949; M.B.A., University of Chicago, 1965; D.B.A., University of Maryland, 1969.

Jones, Everett, Associate Professor, Aerospace Engineering. B.A.E., Rensselaer Polytechnic Institute, 1956; M.A.E., 1960; Ph.D., Stanford University, 1968.

Jones, George F., Professor, Germanic and Slavic Languages. A.B., Emory University, 1938; M.A., Oxford University, 1943; Ph.D., Columbia University, 1951.

Jones, Jack C., Professor, Entomology. B.S., Auburn University, 1942; M.S., 1947; Ph.D., Iowa State University, 1950.

Jones, Rebecca C., Lecturer, Part-Time, College of Journalism. B.S., Northwestern University, 1969; M.S., 1970.

Jones, G. Stephen, Research Professor, Institute for Fluid Dynamics and Applied Mathematics. Ph.D., University of Cincinnati, 1960

Joseloff, Samuel H., Lecturer, Part-Time, English. B.A., Yale University, 1962; M.A., University of Wisconsin, 1963; Ph.D., Princeton University, 1968

Kacser, Claude, Associate Professor, Physics and Astronomy. B.A., Oxford University, 1955; M.A., 1959; Ph.D., 1959.

Kafka, Eric P., Assistant Professor, Counseling and Personnel Services. B.A., State University of New York (Albany), 1961; M.A., 1962; Ph.D., Michigan State University, 1968

Kammeyer, Kenneth C. W., Professor and Chairman, Sociology. B.A., University of Northern Iowa, 1953; M.A., State University of Iowa, 1958; Ph.D., 1960.

Kanal, Laveen N., Professor, Computer Science. B.S., University of Washington, 1951; M.S., 1953; Ph.D., University of Pennsylvania, 1960.

Kantzes, James G., Professor, Botany. B.S., University of Maryland, 1951; M.S., 1954; Ph.D., 1957.

Karlander, Edward P., Associate Professor, Botany. B.S., University of Vermont, 1960; M.S., University of Maryland, 1962; Ph.D., 1964

Karlovitz, Les A., Research Professor, Mathematics and Institute for Fluid Dynamics and Applied Mathematics. B.S., Yale University, 1959; Ph.D., Carnegie Institute of Technology, 1964

Kaskey, Raymond J., Assistant Professor, School of Architecture. B.Arch., Carnegie-Mellon University, 1967; M.Ed., Yale University, 1969

Kasler, Franz J., Associate Professor, Chemistry. Ph.D., University of Vienne, 1959

Kaufman, Stuart B., Associate Professor, History. B.A., University of Florida, 1962; M.A., 1964; Ph.D., Emory University, 1970.

Kedem, Benjamin, Assistant Professor, Mathematics. B.S., Roosevelt University, 1968; M.S., Carnegie-Mellon University, 1970; Ph.D., 1972.

Keeney, Mark, Professor, Chemistry and Dairy Science. B.S., Pennsylvania State University, 1942; M.S., Ohio State University, 1947; Ph.D., Pennsylvania State University, 1950.

Kelejian, Harry H., Professor, Economics. B A., Hofstra College, 1962, M A , University of Wisconsin, 1964, Ph D., 1968

Kelley, David L., Professor, Physical Education. A B., San Diego State College, 1957; M.S., University of Southern California, 1958, Ph.D., 1962.

Kellogg, R. Bruce, Research Professor, Mathematics and Institute for Fluid Dynamics and Applied Mathematics. B.S., Massachusetts Institute of Technology, 1952, Ph.D., University of Chicago, 1959.

Kelly, Ernece B., Assistant Professor, English. B.A., University of Chicago, 1959, Ph.D., Northwestern University 1972.

Kelsey, Roger R., Associate Professor, Administration, Supervision and Curriculum. B.A., Saint Olaf College, 1934, M.A., University of Minnesota, 1940; Ed.D., George Peabody College, 1954.

Kemmery, Robert J., Instructor, Part-Time, Industrial Education. B.S., Indiana University of Pennsylvania, 1971, M Ed., Salisbury State College, 1973.

Kemp, Thomas J., Instructor, Part-Time, Industrial Education. B.S., University of Maryland, 1969; M Ed., 1973

Kenney, Blair G., Assistant Professor, English. B.A , Vassar College, 1955; Ph.D., Harvard University, 1961

Kenny, Shirley S., Professor and Chairman, English. B A., University of Texas, 1955, M A , University of Minnesota, 1957, Ph.D., University of Chicago, 1964

Kent, George D., Professor, History B.S , Columbia University, 1948, M.A., 1949; Ph.D., Oxford University, 1958.

Kerley, Ellis R., Professor and Chairman, Anthropology. B.S., University of Kentucky, 1950, M.S., University of Michigan, 1956; Ph.D., 1962.

Kerr, Frank J., Professor, Physics and Astronomy, Director, Astronomy Program. B.Sc., University of Melbourne, 1938, M.Sc., 1940; M.A., Harvard University, 1951; D.Sc., University of Melbourne, 1962

Kershow, Warren W., Instructor, Part-Time, Recreation. M.S., University of Maryland, 1965.

Kesler, Ethel, Assistant Professor, Physical Education. B.S., University of North Carolina, 1949; M.Sc., Wellesley College, 1953

Keydel, Kurt R., Instructor, Mechanical Engineering B.S., University of Michigan, 1959, B.S.E., 1959, M.S.E., 1961.

Khanna, Raj K., Associate Professor, Chemistry B.S., University of Delhi, 1954; M.S , 1957, Ph.D., Indian Institute of Science, 1962.

Kidd, Jerry S., Professor, College of Library and Information Services. B.S., Illinois Wesleyan University, 1950; M.A., Northwestern University, 1954, Ph.D., 1956

Kieffer, Thomas P., Lecturer, Part-Time, Institute for Applied Agriculture. B.E.S., State University of New York (Syracuse), 1972; B.L.A., 1973.

Kiehl, Edward, Lecturer, Part-Time, Music. B.M.E., Wichita State University, 1961.

Kilbourn, George L., Jr., Instructor, Mathematics. B.S., Yale University, 1950, B.E., 1954.

Kilbourne, Elaine M., Lecturer, Chemistry B.A., Montclair State College, 1944; M.A., Columbia University, 1947.

Kim, Chul E., Assistant Professor, Computer Science. B.S., Seoul National University, 1963, M.S , University of Minnesota, 1971; Ph.D., 1975.

Kim, Hogil, Professor, Electrical Engineering and Physics and Astronomy. B.S., Seoul National University, 1956; Ph.D., University of Birmingham (England), 1964

Kim, Young Suh, Professor, Physics and Astronomy. B.S., Carnegie Institute of Technology, 1958, Ph.D., Princeton University, 1961.

Kimble, Mark W., Assistant Professor, English. B.A., Catholic University of America, 1966, M.A., University of Virginia, 1967, Ph.D., 1970.

King, A. Thomas, Assistant Professor, Economics and Bureau of Business and Economic Research. B.A., Stanford University, 1966, M.Phil., Yale University, 1969, Ph.D., 1972.

King, Raymond L., Professor, Dairy Science. A.B., University of California (Berkeley), 1955; Ph.D., 1958.

King, William E., Jr., Lecturer, Chemical Engineering. B.S., University of Pittsburgh, 1965; M.S., Carnegie-Mellon University, 1968

Kinnaird, John W., Associate Professor, English. B.A , University of California (Berkeley), 1944, M A., Columbia University, 1949; Ph.D., 1959

Kirby, Karen, Assistant Professor, Mathematics. Sc B , Brown University, 1972; M S., 1972, M.A., Princeton University 1974, Ph.D., 1975.

Kirk, James A., Assistant Professor, Mechanical Engineering B.S., Ohio State University, 1967, M S , Massachusetts Institute of Technology, 1969, Ph.D , 1972.

Kirkley, Donald H., Jr., Associate Professor, Speech and Dramatic Art B.A , University of Maryland, 1960, M A , 1962; Ph.D., Ohio State University, 1967.

Kirwan, William E., Professor, Mathematics A B , University of Kentucky, 1960, M.S., Rutgers — The State University, 1962, Ph.D., 1964

Kisabeth, Kathryn L., Instructor, Physical Education. B.S., Ohio State University, 1968; M.Ed., Bowling Green State University, 1973.

Klank, Richard E., Associate Professor, Art. B.Arch., Catholic University of America, 1962; M F.A , 1964

Klann, David K., Instructor, Speech and Dramatic Art. B.A , Southwest Missouri State College, 1967, M.A., University of Connecticut, 1970.

Klarman, William L., Professor, Botany. B.S., Eastern Illinois University, 1957; M.S., University of Illinois (Urbana), 1960; Ph.D., 1962.

Klavon, Albert J., Instructor, Agricultural and Extension Education. B.S., University of Maryland, 1968, M S , 1973

Klein, Ruhama D., Instructor, Oriental and Hebrew Program. B.A., American University, 1956, M.A., 1972.

Kleine, Don W., Associate Professor, English. B A., University of Chicago, 1950; M.A., 1953, Ph.D., University of Michigan, 1961.

Kleppner, Adam, Professor, Mathematics. B.S., Yale University, 1953, M.A., University of Michigan, 1954, Ph.D., Harvard University, 1960.

Knelfelkamp, Lee L., Assistant Professor, Counseling and Personnel Services B.A., Macalester College, 1967, M.A , University of Minnesota, 1973; Ph.D., 1974.

Knifong, James D., Assistant Professor, Early Childhood Elementary Education. B.S , Northern Illinois University, 1964, M.S., University of Illinois (Urbana), 1968, Ph.D , 1971.

Knight, Robert E. L., Associate Professor, Economics. A.B , Harvard University, 1948, Ph.D., University of California (Berkeley), 1958

Knipe, Elizabeth A., Instructor, Institute for Urban Studies. B.A., Trinity College (Washington, D.C.), 1959, M.A., University of Missouri (Kansas City), 1969.

Knott, Gary D., Lecturer, Computer Science. B.A., American University, 1965, M.S., California Institute of Technology, 1970, Ph.D., Stanford University, 1975.

Knox, Virginia R., Instructor, Zoology. B.S., Eastern Kentucky State College, 1964, M.S., University of Maryland, 1969

Kobayshi, T., Assistant Professor, Mechanical Engineering B.S., Nagoya Institute of Technology, 1966, M.S., Illinois Institute of Technology, 1969, Ph.D., 1972

Kolker, Robert P., Assistant Professor, Speech and Dramatic Art. B.A., City University of New York (Queens College), 1962, M.A., Syracuse University, 1965; Ph.D., Columbia University, 1969

Koopman, David W., Research Professor, Institute for Fluid Dynamics and Applied Mathematics. Ph.D., University of Michigan, 1964

Koopman, Elizabeth J., Assistant Professor, Institute for Child Study A B , University of Michigan, 1960; M.A , 1963, Ph.D., University of Maryland, 1973

Korenman, Victor, Associate Professor, Physics and Astronomy B.A., Princeton University, 1958, A.M , Harvard University, 1959, Ph.D., 1965.

Kornblatt, Joyce R., Instructor, Part-Time, English. B A., Carnegie-Mellon University, 1966, M.A., Case-Western Reserve University, 1968.

Koskimen, Patricia, Lecturer, Part-Time, Early Childhood Elementary Education. B A., Connecticut College, 1964, M A.T., Antioch College, 1969, Ph D., University of Maryland, 1975.

Kostovski, Ilja I., Assistant Professor, Germanic and Slavic Languages. Ph.D., Charles University (Prague), 1965.

Koury, Enver M., Associate Professor, Government and Politics B.A., George Washington University, 1954, Ph D , American University, 1958.

Kovalakides, Nicholas J., Assistant Professor, Physical Education, B S., University of Maryland, 1961, M.A., 1968

Kraft, Donald H., Assistant Professor, College of Library and Information Services. B S., Purdue University, 1965, M.S , 1966; Ph.D., 1971

Kraft, Robert H., Lecturer, Part-Time, Music. B.M Eastman School of Music.

Kramer, Amihud, Professor, Horticulture B.S , University of Maryland, 1938, M S., 1939, Ph.D., 1942.

Kramer, Arnold N., Lecturer, School of Architecture. B.S., Massachusetts Institute of Technology, 1966, M S. 1968

Kramer, Charles F., Associate Professor Emeritus, French and Italian Ph.B. Dickinson College, 1911, M A , 1912

Kramer, George F., Professor, Physical Education B.S , University of Maryland, 1953, M.A , 1956 Ph D , Louisiana State University 1967

Kress, Jerry R., Assistant Professor, Philosophy B A , Pacific Lutheran University, 1961, M A University of Michigan, 1962, Ph D. 1967

Krestensen, Elroy R., Associate Professor, Entomology B.S., University of Florida, 1949, M S , 1951; Ph.D., University of Maryland, 1962.

Krewatch, Albert V., Extension Professor Emeritus, Agricultural Engineering B.S., University of Delaware, 1925; M.S., 1929, E.E., 1933

Krichevsky, Micah I., Lecturer, Part-Time, Microbiology B.A., University of Connecticut 1952, M S , University of Illinois, 1955, Ph.D., 1958

Kringen, John A., Lecturer, Part-Time, Government and Politics A B , University of Southern California, 1970

Krisher, Lawrence C., Professor, Institute for Molecular Physics. A B., Syracuse University, 1955, A M Harvard University, 1957; Ph.D., 1959

Krouse, William E., Assistant Professor, Physical Education B S., University of Maryland, 1942, M.Ed , 1952.

Krusberg, Lorin R., Professor, Botany B.S., University of Delaware, 1954, M.S , North Carolina State University, 1956, Ph.D., 1959

Kuehl, Philip G., Associate Professor, College of Business and Management B.S., Miami University (Ohio), 1965, M B A , Ohio State University 1967, Ph.D., 1970.

Kueker, David W., Assistant Professor, Mathematics. A B , University of California (Los Angeles), 1964, M.A. 1966, Ph.D , 1967.

Kuenzel, Wayne J., Assistant Professor, Poultry Science B.S., Bucknell University, 1964, M.S., 1966, Ph D., University of Georgia, 1969

Kuhn, Terry L., Assistant Professor, Music and Secondary Education. B.S., University of Oregon, 1963, M Med , 1967, Ph D., Florida State University 1972.

Kumar, Parmeswar C., Assistant Professor, College of Business and Management. B.Sc., University of Bombay (India), 1956, B.E., University of Baroda (India), 1960, D B M University of Madras (India), 1971, Ph.D , Pennsylvania State University, 1975.

Kumin, Libby B., Assistant Professor, Hearing and Speech Sciences. B A , Long Island University, 1965, M.A., New York University, 1966; Ph.D , 1969.

Kundt, John F., Assistant Professor, Horticulture. B S , West Virginia University, 1952, Ph.D., North Carolina State University, 1969

Kundu, Mukul R., Professor, Physics and Astronomy B Sc., Calcutta University, 1949, M.Sc., 1951, D Sc., University of Paris, 1957.

Kunkle, William E., Assistant Professor, Animal Science B.S , Ohio State University, 1970, M S. 1970, Ph D., 1974

Kupperman, Robert H., Lecturer, Part-Time, Government and Politics B.A , New York University, 1956, Ph D , 1962

Kurtz, John J., Professor, Institute for Child Study B A University of Wisconsin, 1935, M A Northwestern University 1940; Ph.D , University of Chicago, 1947

Kyle, David G., Associate Professor, Institute for Child Study A.B., University of Denver, 1952, M A , 1953 Ed D University of Maryland, 1961

Laffer, Norman C., Professor Microbiology B S Allegheny College, 1929, M.S , University of Maine, 1932, Ph D , University of Illinois (Urbana), 1937

Lahood, Charles G., Lecturer, Part-Time, College of Library and Information Services B A Catholic University 1941, M A 1942, M S , (L S.), 1956.

Laires, Nelita True, Associate Professor, Music B Mus University of Michigan, 1958, M Mus , 1960

Lakshmanan, Sitarama, Associate Professor Chemistry B A., University of Annamalai, 1946 M A 1949, Ph D University of Maryland, 1954

Lambour, Gary P., Assistant Professor, Special Education B A , St. Francis College (Pennsylvania) 1967, M Ed University of Pittsburgh 1969, Ph D Ohio State University 1975.

Lambourne, David L., Lecturer, English B A , University of Hull (England), 1965, M A , 1974

Lamone, Rudolph P., Professor and Dean, College of Business and Management B S University of North Carolina, 1960. Ph D 1966

Lampe, John R., Assistant Professor History B A Harvard University 1957 M A University of Minnesota 1964 Ph D , University of Wisconsin, 1971

Landa, Aviva M., Instructor, Oriental and Hebrew Program B A Hebrew University Jerusalem 1968

Landgren, Marchal E., Lecturer, Part-Time, Art

Landry, L. Bartholomew, Assistant Professor, Sociology and Afro-American Studies. B.A., Saint Mary's Seminary, 1961; B.A., Xavier University, 1966; Ph.D., Columbia University, 1971

Landsberg, Helmut E., Professor and Acting Director, Institute for Fluid Dynamics and Applied Mathematics. Ph.D., University of Frankfurt, 1930

Lanning, Eldon W., Assistant Professor, Government and Politics. B.S., Northwestern University, 1960; Ph.D., University of Virginia, 1965.

Lapinski, Tadeusz, Associate Professor, Art. M.F.A., Academy of Fine Arts (Warsaw), 1955.

Larkin, Willard W., Associate Professor, Psychology. B.S., University of Michigan, 1959; M.A., University of Pennsylvania, 1963; Ph.D., University of Illinois (Urbana), 1967.

Larkins, Hayes C., Lecturer, Part-Time, Institute of Criminal Justice and Criminology. B.S., Michigan State University, 1961; M.S., 1966.

Lashinsky, Herbert, Research Professor, Institute for Fluid Dynamics and Applied Mathematics. B.A., City College of New York, 1950; Ph.D., Columbia University, 1961.

Laster, Howard J., Professor, Physics and Astronomy. A.B., Harvard University, 1951; Ph.D., Cornell University, 1957.

Lauridsen, David A., Lecturer, Part-Time, Secondary Education. B.A., Michigan State University, 1969; M.A., 1970.

Lavender, Abraham D., Visiting Assistant Professor, Sociology. B.A., University of South Carolina, 1963; M.A., 1965; Ph.D., University of Maryland, 1972.

Lawbaugh, William M., Lecturer, Part-Time, College of Journalism. A.B., Saint Louis University, 1965; M.A., 1967; Ph.D., University of Missouri, 1972.

Lawrence, Richard E., Associate Professor, Counseling and Personnel Services. B.S., Michigan State University, 1955; M.A., 1957; Ph.D., 1965.

Lawrence, Robert G., Associate Professor, Agricultural and Resource Economics. B.Sc., University of Oklahoma, 1957; M.B.A., 1960; Ph.D., Texas Agricultural and Mechanical University, 1969

Lawson, Lewis A., Professor, English. B.S., East Tennessee State University, 1957; M.A., 1959; Ph.D., University of Wisconsin, 1964

Lay, David C., Associate Professor, Mathematics. B.A., Aurora College, 1962; M.A., University of California (Los Angeles), 1965; Ph.D., 1966.

Layman, John W., Associate Professor, Physics and Astronomy. A.B., Park College, 1955; M.S.Ed., Temple University, 1962; Ed.D., Oklahoma State University, 1970.

Lazar, Barbara D., Lecturer, Secondary Education. A.B., Syracuse University, 1969; M.A., University of South Florida, 1971.

Lazaris, Evangelos S., Associate Professor, School of Architecture. B.Arch., University of Oregon, 1968; M.S.Arch., Cornell University, 1970.

Lea, John D., Instructor, Agricultural and Resource Economics. B.S., Louisiana State University, 1969; M.S., 1974

Lea, John K., Assistant Professor, Speech and Dramatic Art. B.A., Miami University (Ohio), 1957; M.A., 1964; Ph.D., University of Maryland, 1975.

Lee, Chi H., Associate Professor, Electrical Engineering. B.S., National Taiwan University (Taipei), 1959; M.S., Harvard University, 1962; Ph.D., 1967.

Lee, Young Jack, Assistant Professor, Mathematics. B.S.E., Seoul National University, 1964; M.S., Ohio State University, 1972; Ph.D., 1974

Lee, Richard W., Assistant Professor, College of Journalism. B.S., University of Illinois (Urbana), 1956; M.A., Southern Illinois University, 1964; Ph.D., State University of Iowa, 1972

Leedy, Charlotte A., Assistant Professor, Recreation. B.S., University of Maryland, 1960; M.A., 1966.

Leeper, Sarah L., Professor, Early Childhood Elamentary Education. A.B., Florida State College for Women, 1932; M.A., Florida State University, 1947; Ed.D., 1953.

Leete, Burt A., Associate Professor, College of Business and Management. B.S., Juniata College, 1962; M.B.A., University of Maryland, 1964; J.D., American University, 1969.

Leffel, Emory C., Professor, Animal Science. B.S., University of Maryland, 1943; M.S., 1947; Ph.D., 1953.

Lehner, Ellen C., Professor, Mathematics. B.S., Rutgers — The State University, 1951; M.S., Douglass College, 1953; Ph.D., Purdue University, 1957

Lehner, Guydo R., Professor, Mathematics. B.S., Loyola University, 1951; M.S., University of Wisconsin, 1953; Ph.D., 1958.

Leiserson, Marion B., Instructor, Early Childhood Elementary Education. B.S., University of Minnesota, 1945; M.S., University of Maryland, 1970; M.Ed., 1970

Lejins, Peter P., Professor, Sociology. Director, Institute of Criminal Justice and Criminology. M.Phil., University of Latvia, 1930; M.L., 1933; Ph.D., University of Chicago, 1938

Lembach, John, Professor, Early Childhood Elementary Education and Art. B.A., University of Chicago and Chicago Art Institute, 1934; M.A., Northwestern University, 1937; Ed.D., Columbia University, 1946

Lemmer, John F., Lecturer, Information Systems Management. B.S., Carnegie Institute of Technology, 1960; M.S., Purdue University, 1966

Lemmon, Louise, Associate Professor, Home Economics and Secondary Education. B.S., Northern Illinois University, 1946; M.S., University of Wisconsin, 1951; Ed.D., University of Illinois, 1961.

Lengermann, Joseph J., Associate Professor, Sociology. B.A., University of Notre Dame, 1958; S.T.B., Gregorian University, 1960; M.A., University of Notre Dame, 1964; Ph.D., Cornell University, 1969

Leonard, Mary M., Assistant Professor, Counseling and Personnel Services. B.S., Boston College, 1968; M.A., University of Minnesota, 1971; Ph.D., 1974

Lepper, Henry A., Jr., Professor, Civil Engineering. B.S.C.E., George Washington University, 1936; M.S., University of Illinois (Urbana), 1938; D.Eng., Yale University, 1947

Lepson, Inda, Instructor, Mathematics. B.A., New York University, 1941; M.A., Columbia University, 1945.

Lesher, James H., Associate Professor, Philosophy. B.A., University of Virginia, 1962; Ph.D., University of Rochester, 1966

Lessley, Billy V., Professor, Agricultural and Resource Economics. B.S., University of Arkansas, 1957; M.S., 1960; Ph.D., University of Missouri, 1965.

Levine, Marvin J., Professor, College of Business and Management. B.A., University of Wisconsin, 1952; J.D., 1954; M.A., 1959; Ph.D., 1964

Levine, Max J., Lecturer, College of Business and Management. B.S., University of Maryland, 1969; M.B.A., 1972.

Levine, William S., Associate Professor, Electrical Engineering. B.S., Massachusetts Institute of Technology, 1962; Ph.D., 1969.

Levine, Stephen M., Assistant Professor, Counseling and Personnel Services. A.B., City University of New York (Hunter College), 1967; M.S.E., City University of New York (City College), 1969; Ph.D., Hofstra University, 1972.

Levinsen, John Z., Professor, Psychology. B.A., University of Toronto, 1939, M.A., 1940; Ph.D., 1948.

Levinson, Judith C., Assistant Provost, Division of Arts and Humanities. B.S., University of Maryland, 1964; M.A., Harvard University, 1965; Ph.D., 1968

Levitan, Herbert, Associate Professor, Zoology. B.E.E., Cornell University, 1962; Ph.D., 1965.

Levitine, George, Professor and Chairman, Art. M.A., Boston University, 1946; Ph.D., Harvard University, 1952.

Leviton, Daniel, Professor, Health Education. B.S., George Washington University, 1953; M.A., Springfield College, 1956; Ph.D., University of Maryland, 1967.

Levy, Robert A., Lecturer, Part-Time, College of Business and Management. B.S., American University, 1963; M.B.A., 1964; Ph.D., 1966.

Lewis, Roger K., Associate Professor, School of Architecture. B.Arch., Massachusetts Institute of Technology, 1964; M.Arch., 1967.

Li, Ta-Yung, Visiting Assistant Professor, Meteorology. B.S., Chung Yuan University, 1967; M.S., Drexel University, 1969; Ph.D., 1972.

Liberman, Esther, Instructor, Oriental and Hebrew Program. M.A., University of Chicago, 1949.

Lichton, Ira J., Visiting Professor, Part-Time, Food, Nutrition and Institution Administration. B.S., University of Illinois (Urbana), 1950; M.S., 1951; Ph.D., 1954

Lieberman, Charles, Assistant Professor, Economics. B.S., Massachusetts Institute of Technology, 1970; A.M., University of Pennsylvania, 1972; Ph.D., 1974

Liebowitz, Burt H., Lecturer, Part-Time, Mechanical Engineering. B.E.E., Rensselaer Polytechnic Institute, 1957; M.S., 1960; M.S.E.E., Brooklyn Polytechnic Institute, 1963.

Liesener, James W., Professor, College of Library and Information Services. B.A., Wartburg College, 1955; M.A., University of Northern Iowa, 1960; A.M.L.S., University of Michigan, 1962; Ph.D., 1967.

Lighter, John J., Lecturer, Air Force Aerospace Studies Program. B.S., University of Maryland, 1952; M.Ed., 1953

Ligomenides, Panos A., Professor, Electrical Engineering. B.S., University of Athens, 1951; M.S., 1952; M.S.E.E., Stanford University, 1956; Ph.D., 1958.

Lin, Hung Chang, Professor, Electrical Engineering. B.S., Chiao-Tung University, 1941; M.S.E., University of Michigan, 1948; Ph.D., Polytechnic Institute of Brooklyn, 1956.

Lin, Ying-Nan, Assistant Professor, Textiles and Consumer Economics. B.S., National Chung-Hsing University (Taiwan), 1958; Ph.D., University of Tennessee, 1974

Linder, Harris J., Associate Professor, Zoology. B.S., Long Island University, 1951; M.S., Cornell University, 1955; Ph.D., 1958.

Linder, Lawrence A., Lecturer, Part-Time, School of Architecture. B.Arch., Pennsylvania State University, 1967

Lindes, Olga, Instructor, Part-Time, Germanic and Slavic Languages and Literature. B.S., Medical School of Odessa (USSR), 1941; M.S., Georgetown University, 1966

Lindsay, David H., Lecturer, College of Business and Management. B.S., University of Delaware, 1970; B.A., 1970; M.B.A., 1972

Lindsay, Rao H., Associate Professor, Social Foundations of Education. B.A., Brigham Young University, 1954; M.A., University of Michigan, 1958; Ph.D., 1964

Linduska, James J., Assistant Professor, Entomology. B.S., University of Maryland, 1965; M.S., 1968; Ph.D., 1973.

Link, Conrad B., Professor, Horticulture. B.S., Ohio State University, 1933; M.S., 1934; Ph.D., 1940.

Linkew, Irving, Associate Professor, Speech and Dramatic Art. B.A., University of Denver, 1937; M.A., 1938.

Lipsman, Renaid L., Professor, Mathematics. B.S., City University of New York (City College), 1964; Ph.D., Massachusetts Institute of Technology, 1967.

Liu, Chuan Shen, Professor, Physics and Astronomy. Tunghai University (Taiwan), 1960; M.A., University of California (Berkeley), 1964; Ph.D., 1968

Liu, Tai-Ping, Assistant Professor, Mathematics. B.S., National Taiwan University, 1968; M.S., Oregon State University, 1970; Ph.D., University of Michigan, 1973

Lloyd-Jones, Kenneth, Lecturer, French and Italian. B.A., Hons., University of Wales (Cardiff), 1960.

Lockard, J. David, Associate Professor, Botany, Professor, Secondary Education. B.S., Pennsylvania State University, 1951; M.Ed., 1955; Ph.D., 1962

Locke, Edwin A., Professor, Psychology and College of Business and Management. B.A., Harvard University, 1960; M.A., Cornell University, 1962; Ph.D., 1964

Loeb, Stephen E., Associate Professor, College of Business and Management. B.S., University of Pennsylvania, 1961; M.B.A., University of Wisconsin, 1963; Ph.D., 1970.

Loh, Ming-Jean, Lecturer, Oriental and Hebrew Program. B.A., National Taiwan University, 1960; M.A., 1962; M.A., Yale University, 1967.

Long, Howard F., Lecturer, Institute for Child Study. B.S., Juniata College, 1950; M.A., Goucher College, 1963; Ph.D., University of Maryland, 1973.

Long, Patricia A., Instructor, Physical Education. B.S., West Chester State College, 1969; M.A., University of Maryland, 1971.

Longest, James W., Professor, Agricultural and Extension Education. B.S., University of Illinois (Urbana), 1951; M.S., 1953; Ph.D., Cornell University, 1957

Longley, Edward L., Jr., Associate Professor, Secondary Education. B.A., University of Maryland, 1950; M.A., Columbia University, 1953; Ed.D., Pennsylvania State University, 1967.

Lopez-Escobar, Edgar G., Professor, Mathematics. B.A., Cambridge University, 1958; M.A., University of California (Berkeley), 1961; Ph.D., 1965

Lounsbury, Myron O., Associate Professor and Chairman, American Studies Program. B.A., Duke University, 1961; M.A., University of Pennsylvania, 1962; Ph.D., 1966.

Loutzenheiser, Roy C., Assistant Professor, Civil Engineering. B.C.E., Ohio State University, 1966; M.S.C.E., Georgia Institute of Technology, 1968; Ph.D., Texas Agricultural and Mechanical University, 1972.

Luetkemeyer, Joseph F., Professor, Industrial Education. B.S., Stout State College, 1953; M.S., 1954; Ed.D., University of Illinois (Urbana), 1961.

Lukenbill, W. B., Assistant Professor, Secondary Education and College of Library and Information Services. B.S., North Texas State University, 1961; M.L.S., University of Oklahoma, 1964

Lutwack, Leonard I., Professor, English. B.A., Wesleyan University, 1939; M.A., 1940; Ph.D., Ohio State University 1950.

Lynch, James B., Jr., Professor, Art. A.B., Harvard University, 1941; A.M., 1947; Ph.D., 1960

Lynch, Jeffrey P., Instructor, Part-Time, English. B.A., University of Dayton, 1968; M.A., 1970.

Lyndon, Donlyn, Kea Distinguished Professor, School of Architecture. A.B., Princeton University, 1957; M.F.A., 1959

MacBain, William, Professor, French and Italian. M.A., Hons., Saint Andrews University, 1952; Ph.D., 1955.

MacDonald, Patricia A., Lecturer, Afro-American Studies and Urban Studies. B.A., University of Maryland, 1969, M.A., 1972

MacDonald, William M., Professor, Physics and Astronomy B.A., University of Pittsburgh, 1950, Ph.D., Princeton University, 1955.

Mack, Maynard, Jr., Associate Professor, English. B.A., Yale University, 1964. M.Phil., 1969, Ph.D., 1969

MacLachlan, Colin, Visiting Associate Professor, Part-Time, Mathematics. B.Sc., University of Saint Andrews (Scotland), 1961, Ph.D., University of Birmingham (England), 1966.

MacLeod, Anne S., Assistent Professor, Part-Time, College of Library and Information Services. B.A., University of Chicago, 1949, M.L.S., University of Maryland, 1966, Ph.D., 1973

MacQuillan, Anthony M., Associate Professor, Microbiology B.S.A., University of British Columbia, 1956, M.S., 1958, Ph.D., University of Wisconsin, 1962.

MacRae, Elizabeth C., Assistant Professor, Economics A.B., Harvard University, 1962, Ph.D., Massachusetts Institute of Technology, 1969

MacReady, George B., Assistant Professor, Measurement and Statistics. B.A., Williamette University, 1956; M.A., University of Oregon, 1967, Ph.D., University of Minnesota, 1971.

Madan, Dilip B., Lecturer, Economics. B.Comm., University of Bombay, 1967; M.A., University of Maryland, 1971; Ph.D., 1972 and 1975.

Madden, Dorothy G., Professor, Dance. A.B., Middlebury College, 1934, M.A., Syracuse University, 1937; Ph.D., New York University, 1962.

Magoon, Thomas M., Professor, Counseling and Personnel Services and Psychology, Director, Counseling Center. B.A., Dartmouth College, 1947, M.A., University of Minnesota, 1951; Ph.D., 1954

Magrab, P., Lecturer, Part-Time, Counseling and Personnel Services. B.A., City University of New York (City College), 1960, M.A., Columbia University, 1961, Ph.D., University of Maryland, 1969

Maida, Peter, Associate Professor, Institute of Criminal Justice and Criminology. B.A., Saint Vincent College, 1960; M.A., Fordham University, 1962; Ph.D., University of Pennsylvania, 1969.

Majeska, George P., Assistant Professor, History. B.A., City University of New York (Brooklyn College), 1961, M.A., Indiana University, 1964, Ph.D., 1968.

Majeskie, J. Lee, Assistant Professor, Dairy Science. B.S. University of Wisconsin, 1964, M.S., 1966, Ph.D., Kansas State University, 1970.

Male, George A., Professor, Social Foundations of Education. B.A., University of Michigan, 1948; M.A., 1949; Ph.D., 1952.

Maley, Donald, Professor and Chairman, Industrial Education. B.S., California State College (Pennsylvania), 1943; M.A., University of Maryland, 1947, Ph.D., 1950.

Mallory, Nancy, Instructor, Early Childhood Elementary Education. B.A., Fresno State College, 1949.

Maloni, Paul J., Assistant to the Vice Chancellor for Administrative Affairs. B.A., University of Maryland, 1963.

Mangum, Barry, Instructor, Part-Time, Recreation. B.S., University of Bridgeport, 1955; M.S., University of Illinois, 1956.

Manning, Charles, Professor Emeritus, English; Dean Emeritus, College of Arts and Sciences. B.S., Tufts University, 1929, M.A., Harvard University, 1931, Ph.D., University of North Carolina, 1950.

Marando, Vincent L., Associate Professor, Institute for Urban Studies. B.S., State University College, 1960; M.A., Michigan State University, 1964, Ph.D., 1967.

Marasco, Richard J., Associate Professor, Agricultural and Resource Economics. B.S., Utah State University, 1965, M.S., 1966, Ph.D., University of California, 1969

Marchello, Joseph M., Professor, Chemical Engineering, Provost, Division of Mathematical and Physical Sciences and Engineering. B.S.Ch.E., University of Illinois (Urbana), 1955, Ph.D., Carnegie Institute of Technology, 1959

Marcinkowski, M. John, Professor, Mechanical Engineering B.S., University of Maryland, 1953, M.S., University of Pennsylvania, 1955, Ph.D., 1959

Marcus, Robert F., Assistent Professor, Institute for Child Study. B.A., Montclair State College, 1965, M.A., New York University, 1967, Ph.D., Pennsylvania State University, 1973

Margulies, Irving P., Lecturer, Part-Time, Institute for Urban Studies. A.B., Wayne University, 1943; LL.B., 1950.

Maril, Herman, Professor, Art. Grad., The Maryland Institute, 1928

Marion, Jerry B., Professor, Physics and Astronomy. B.A., Reed College, 1952, M.S., Rice University, 1953, Ph.D., 1955.

Markley, Nelson G., Associate Professor, Mathematics. A.B., Lefeyette College, 1962; M.A., Yale University, 1964, Ph.D., 1966.

Marks, Colin H., Associate Professor, Mechanical Engineering B.S., Carnegie Institute of Technology, 1956; M.S., 1957, Ph.D., University of Maryland, 1965.

Marquardt, Warren W., Associate Professor, Veterinary Science. B.S., University of Minneosta, 1959, D.V.M., 1961, Ph.D., 1970.

Marra-Lopez, Jose R., Professor, Spanish and Portuguese. B.A., (Licenciatura), University of Madrid (Spain), 1959

Marris, Robin, Visiting Professor, Economics. B.A., Cambridge University, 1947, Sc.D., 1968

Marro, Jacqueline C., Instructor, Textiles and Consumer Economics. B.S., University of Vermont, 1966, M.A., New York University, 1971.

Marsh, Jean K., Lecturer, Part-Time, Physical Education and Secondary Education. B.S., State University of New York (Cortland), 1943; M.S., Texas Women's University, 1946.

Martin, Barry J., Instructor, Industrial Education. B.A., Montclair State College, 1974

Martin, David L., Associate Professor, Chemistry. B.S., University of Minnesota, 1963, M.S., University of Wisconsin, 1965; Ph.D., 1968.

Martin, Frederick W., Assistant Professor, Physics and Astronomy. A.B., Princeton University, 1957; M.S., Yale University, 1958, Ph.D., 1964

Martin, James G., Professor, Psychology. B.S., University of North Dakota, 1951, M.A., University of Minnesota, 1958, Ph.D., 1960.

Martin, L. John, Professor, College of Journalism. B.A., American University (Cairo), 1947; M.A., University of Minnesota, 1951; Ph.D., 1955.

Martin, Minerva L., Assistant Professor, English. B.A., University of Alabama, 1931; M.A., Louisiana State University 1937, Ph.D., 1940

Martin, Monroe H., Professor Emeritus, Institute for Fluid Dynamics and Applied Mathematics. B.S., Lebenon Valley College, 1928, Ph.D., Johns Hopkins University, 1932

Martin, Raymond F., Associate Professor, Philosophy. B.A., Ohio State University, 1962; M.A., 1964; Ph.D., University of Rochester, 1968.

Marvil, David L., Instructor, Part-Time, Institute of Criminal Justice and Criminology. B.A., University of Miami, 1954, M.A., Inter-American University, 1973

Marx, George L., Professor and Chairman, Counseling and Personnel Services. B.A., Yankton College, 1953; M.A., State University of Iowa, 1956; Ph.D., 1959.

Massie, Cecil M., Sr., Instructor, Institute of Applied Agriculture. B.S., Virginia Military Institute, 1950, M.S., 1957.

Mather, Ian H., Assistant Professor, Dairy Science. B.Sc., University College of North Wales, 1966, Ph.D., 1969

Matossian, Mary K., Associate Professor, History. B.A., Stanford University, 1951; M.A., American University (Beirut), 1952; Ph.D., Stanford University, 1955.

Matteson, Richard L., Associate Professor, Institute for Child Study. B.A., Knox College, 1952, M.A., University of Maryland, 1955, Ed.D., 1962.

Matteucci, Aldo, Lecturer, Agricultural and Resource Economics. B.S., Federal Technology Institute, Zurich, Switzerland, 1966, M.S., University of California (Berkeley), 1968.

Matthew, Gary K., Assistant Professor, Mechanical Engineering. B.S., University of Florida, 1970; M.S., 1973, Ph.D., 1975

Matthews, David L., Reseerch Associate Professor, Institute for Fluid Dynamics and Applied Mathematics. B.S., Queens University (Canada), 1949, Ph.D., Princeton University, 1959.

Matthews, Edward P., Jr., Lecturer, College of Business and Management. B.S., University of Maryland, 1950; M.A., University of Denver, 1959

Matthews, Thomas A., Associate Professor, Physics and Astronomy. B.A., University of Toronto, 1950, M.S., Case-Western Reserve University, 1951; Ph.D., Harverd University, 1956

Mattick, Joseph F., Professor, Dairy Science. B.S., Pennsylvania State University, 1942, Ph.D., 1950

Mattingly, Joseph G., Jr., Director of Undergraduate Studies, College of Business and Management. B.S., University of Meryland, 1958, M.B.A., 1966.

May, Gordon S., Assistant Professor, College of Business and Management. B.S.B.A., Wittenberg University, 1964, M.B.A., University of Michigan, 1965, Ph.D., Michigan State University, 1972

Mayer-Sommer, Alan P., Lecturer, College of Business and Menegement. B.A., Columbia University, 1963, M.B.A. Harvard University, 1965.

Mayes, Sharon S., Assistent Professor, Sociology. B.A., Michigan State University, 1970, M.A., Yale University, 1972; Ph.D., 1974

Mayfield, Julian, Lecturer, Part-Time, Afro-American Studies.

Mayo, Marlene J., Associate Professor, History. B.A., Wayne State University, 1954, M.A., Columbia University, 1957, Ph.D., 1961.

Mayor, John R., Visiting Professor, Secondery Education, Assistant Provost for Research, Division of Human and Community Resources. B.S., Knox College, 1928, M.A., University of Illinois, 1929, Ph.D., University of Wisconsin, 1933

Mazzocchi, Paul H., Associate Professor, Chemistry. Bach., City University of New York (Queens College), 1961, Ph.D., Fordhem University, 1966

McCall, J. P., Assistant Professor, Animal Science. B.S., Texas Agricultural and Mechanical University, 1966, M.S., 1969, Ph.D., 1972.

McCarn, Davis B., Lecturer, Part-Time, College of Library and Information Services. B.A., Haverford College, 1951.

McCarrick, Earleen M., Assistant Professor, Government and Politics. B.A., Louisiana State University, 1953, M.A., 1955; Ph.D., Vanderbilt University, 1964

McCarthy, Thomas R., Instructor, Part-Time, Economics B.A., Assumption College, 1971, M.A., University of Maryland, 1973.

McClay, Mary B., Instructor, Mathematics. B.Ed., Eastern Illinois University, 1937, M.S., University of Illinois (Urbana), 1941.

McCleary, Robert F., Lecturer, Speech and Dramatic Art B.A., University of Maryland, 1965, M.A., 1967.

McClellan, Gene E., Assistant Professor, Physics and Astronomy. B.S., Iowa State University, 1965, M.S., Cornell University, 1968, Ph.D., 1970

McClellan, Michael T., Assistent Professor, Computer Science. B.S., Marquette University, 1960, M.S., University of Wisconsin, 1962; Ph.D., 1971.

McClelland, E. Louise, Associate Professor, Music. A.B., College of Wooster, 1957, M.A., Columbia University, 1959, Dipl., Academy of Music, Vienna (Austria), 1963.

McClure, L. Morris, Professor, Administration, Supervision and Curriculum. B.A., Western Michigan University, 1940, M.A., University of Michigan, 1946, Ed.D., Michigan State University, 1953

McClurg, Charles A., Assistant Professor, Horticulture. B.S., Iowa State University, 1966, M.S., Pennsylvania State University, 1968, Ph.D., 1970

McConaghy, Barbara F., Lecturer, Part-Time, Housing and Applied Design. A.B., University of Missouri, 1967

McConnell, Dennis, Lecturer, College of Business and Management. B.S., University of Maryland, 1967, M.B.A., University of Chicago, 1969.

McCormack, Robert D., Instructor, Health Education B.S.Ed., Central Missouri State University, 1973, M.S., 1975

McCuen, Richard H., Associate Professor, Civil Engineering B.S., Carnegie-Mellon University, 1967, M.S., Georgia Institute of Technology, 1970; Ph.D., 1971

McCusker, John J., Assistant Professor, History. B.A., Saint Bernards College, 1961, M.A., University of Rochester, 1963, Ph.D., University of Pittsburgh, 1970.

McDonagh, Joseph M., Senior Instructor, Fire Service Extension. B.S., University of Maryland, 1961

McDonald, Frank B., Professor, Part-Time, Physics and Astronomy. B.S., Duke University, 1948, M.S., University of Minnesota, 1952, Ph.D., 1955

McGee, Michael P., Lecturer, College of Business and Management. B.S., University of Maryland, 1974, M.B.A. 1975.

McGuire, Martin C., Professor, Economics. B.S., United States Military Academy, 1955, B.A., Oxford University, 1958, Ph.D., Harverd University, 1964

McHugh, John C., Instructor, Physical Education. B.S., University of Maryland, 1959, M.Ed., American University, 1968

McIlrath, Thomas J., Associate Professor, Institute for Fluid Dynamics and Applied Mathematics. B.S., Michigan State University, 1960, Ph.D., Princeton University, 1966

McIntire, Roger W., Professor, Psychology. B.A., Northwestern University, 1958, M.A., Louisiana State University, 1960, Ph.D., 1962

McIntyre, Jennie J., Associate Professor Sociology A B Howard College, 1960; M S., Florida State University 1962; Ph D 1966

McIntyre, Margaret L., Instructor Food Nutrition and Institution Administration B S Oregon State College, 1948; M.S., University of Maryland, 1975

McKay, Hayden N., Assistant Professor School of Architecture B A., University of California (Santa Barbara) 1969; M Arch University of California (Los Angeles) 1973

McKee, Thomas E., Lecturer College of Business and Management B S East Tennessee University, 1969; M.B A Georgia State University 1973

McKee, C. G., Professor Agronomy B S., University of Maryland, 1951; M.S., 1955; Ph D., 1959

McKnight, Dorothy B., Assistant Professor, Physical Education, Director, Women's Intercollegiate Athletics. B.S., Ursinus College 1957; M Ed., Temple University 1960

McLaughlin, William K., Instructor, Health Education B.S., University of Maryland, 1973; M.A., 1975.

McLoone, Eugene P., Associate Professor, Economics and Administration, Supervision and Curriculum. B.A., LaSalle College, 1951; M.S., University of Denver 1952; Ph.D., University of Illinois (Urbana), 1961

McMullan, Yvonne O., Assistant Professor, Counseling and Personnel Services, Counselor, University Counseling Center B A Emory University 1968; M Ed., Georgia State University 1970; Ph.D. 1973

McNelly, Theodore H., Professor, Government and Politics B S., University of Wisconsin, 1941; M A 1942; Ph D., Columbia University 1952

McWhinnie, Harold J., Associate Professor, Housing and Applied Design and Secondary Education B A E., Art Institute of Chicago, 1953; M F A., 1957; Ed D., Stanford University, 1965.

Measday, Walter S., Lecturer, Part-Time Economics. A B College of William and Mary, 1941; Ph D Massechusetts Institute of Technology 1955.

Medvene, Arnold, Associate Professor, Counseling and Personnel Services, Counselor, University Counseling Center B.S., Temple University, 1959; M Ed., 1963; Ed D., University of Kansas, 1968.

Meeker, Barbara F., Associate Professor, Sociology. B.A., University of Kansas, 1961; M A., Stanford University 1964; Ph.D., 1966

Meersman, Roger L., Professor, Speech and Dramatic Art B.A., Saint Ambrose College, 1952; M A., University of Illinois (Urbana), 1959; Ph D., 1962

Meier, David W., Lecturer, Part-Time, College of Business and Management. B.A., University of Michigan, 1966 M B.A., Loyola College, 1972

Meijer, Marianne S., Assistant Professor, French and Italian. M A., Catholic University of America, 1960; Ph D., 1972.

Melnik, Walter L., Professor, Aerospace Engineering. B.S., University of Minnesota, 1951; M.S., 1953; Ph.D., 1964

Meltzer, R. H., Assistant Professor, Psychology B A., Johns Hopkins University 1968; Ph D., University of California (LaJolla), 1971.

Menard, John P., Instructor and Director, Computer Science Center A B., Saint Michaels College, 1954

Mendeloff, Henry, Professor and Chairman, Spanish and Portuguese. B S., City University of New York (City College), 1936; M S., 1939; Ph D., Catholic University of America, 1960

Menzer, Robert E., Professor, Entomology, Associate Dean for Graduate Studies. B S., University of Pennsylvania 1960; M S., University of Maryland, 1962; Ph.D., University of Wisconsin, 1964

Merkel, James A., Associate Professor, Agricultural Engineering. B.S.A.E., Pennsylvania State University 1962; M.S., Iowa State University, 1965; Ph D., 1967.

Merrick, Charles P., Associate Professor Emeritus, Agricultural Engineering B.S.C.E., University of Maryland, 1933.

Merrill, Horace S., Professor, History B E., Wisconsin State University (River Falls), 1932; Ph M., University of Wisconsin, 1933; Ph.D., 1942

Messersmith, Donald H., Professor Entomology B.Ed., University of Toledo, 1951; M.S., University of Michigan, 1953; Ph.D., Virginia Polytechnic Institute, 1962

Meszaros, Imre, Lecturer, Part-Time, College of Library and Information Services. B S., Johns Hopkins University, 1964; M.A., University of Maryland, 1966; M S (L.S.), Catholic University, 1969

Metcalf, John T., Assistant Professor, Mechanical Engineering, B.S., United States Naval Academy, 1949; M.S., Massachusetts Institute of Technology, 1957; D.Eng., Catholic University of America, 1974.

Metz, Joseph F., Jr., Assistant Dean for Undergraduate Studies B A., University of Maryland, 1960; Ph D., 1971

Meyer, Charlton G., Associate Professor Music B Mus., Curtis Institute of Music, 1952

Meyer, Lynne M., Lecturer, Part-Time Horticulture B S University of Maryland, 1974

Meyer, Paul A., Associate Professor Economics B A., Johns Hopkins University, 1961; Ph D., Stanford University, 1966

Michols, Roger L., Visiting Lecturer, Part-Time History B S Wisconsin State College, 1956; M S., University of Wisconsin (Madison), 1959; Ph D., 1964

Mietus, Walter S., Associate Professor, Industrial Education B S., Chicago Teachers College, 1957; M Ed., Illinois State Teachers College, 1959; Ed.D., Loyola University, 1966

Migliazza, Ernest C., Assistant Professor, Anthropology B A., Indiana University, 1963; M A., 1967; Ph.D., 1972

Mikulski, Piotr W., Professor, Mathematics B A., Lyceum (Warsaw), 1942; M S., School of Planning and Statistics 1952; Ph D., University of California (Berkeley), 1961

Milazzo, Tony C., Associate Professor and Chairman, Special Education B S., Indiana State University, 1955; M.S., 1957; Ed D., George Peabody College for Teachers, 1963

Milhollan, Frank, Associate Professor, Institute for Child Study B.A., Colorado College, 1949; M P.S., University of Colorado, 1951; Ph.D., University of Nebraska, 1966.

Miller, Carol R., Lecturer, Food, Nutrition and Institution Administration, B.S., Villa Maria College, 1970; M Ed., The Johns Hopkins University 1974

Miller, Catherine M., Associate Professor, Health Education B S., Illinois State University (Normal), 1956; M A., Colorado State College, 1959; Ph.D., Ohio State University, 1967

Miller, Douglas R., Visiting Assistant Professor, Entomology B.S., University of California (Davis), 1964; M.S., 1965; Ph.D., 1969

Miller, Frederick P., Professor, Agronomy B S., Ohio State University, 1958; M.S., 1961; Ph D., 1965.

Miller, Gerald R., Associate Professor, Chemistry B.A., University of Wisconsin, 1958; M.S., University of Illinois (Urbana), 1960; Ph.D., 1962

Miller, James R., Professor and Chairman, Agronomy B S., University of Maryland, 1951; M S., 1953; Ph.D., 1956

Miller, Joseph W., Lecturer, English, B A., Saint John Fisher College, 1958; M A., University of Rochester, 1960

Miller, Mary R., Associate Professor, English B A., University of Iowa, 1951; M A., University of Denver, 1959; Ph.D., Georgetown University 1969.

Miller, Myron H., Visiting Associate Professor, Part-Time, Institute for Fluid Dynamics and Applied Mathematics. A.B., Cornell University 1958; M.S., Clarkson College, 1960; Ph.D., University of Maryland, 1968.

Miller, Paula J., Assistant Professor, Sociology. B.A., University of Texas (Austin), 1969; M.A., 1971; Ph.D., 1974

Mills, David H., Professor, Psychology, Counselor, Counseling Center. B.S., State University of Iowa, 1955; M.S., 1957; Ph.D., Michigan State University, 1964.

Mills, David L., Assistant Professor, Computer Science. B.S.E., University of Michigan, 1960; 1961; M.S.E., 1962; M.S., 1964; Ph.D., 1971.

Mills, Harlan D., Visiting Professor, Part-Time, Computer Science. B.Sc., Iowa State University, 1948; M.S., 1950; Ph.D., 1952.

Mills, Judson R., Jr., Professor, Psychology B A., University of Wisconsin, 1953; Ph.D., Stanford University, 1958

Minker, Jack, Professor and Chairman, Computer Science. B.A., City University of New York (Brooklyn College), 1949; M S., University of Wisconsin, 1950; Ph.D., University of Pennsylvania, 1959.

Minor, W. William, Assistant Professor, Institute of Criminal Justice and Criminology. B.S., Michigan State University, 1968; M.S., Florida State University, 1973; Ph.D., 1975.

Mintz, Lawrence E., Associate Professor American Studies Program. B.A., University of South Carolina, 1966; M A Michigan State University, 1967; Ph D., 1969

Mish, Charles C., Professor, English. B.A., University of Pennsylvania, 1936; M A., 1946; Ph.D., 1951

Mishan, Ezra J., Visiting Professor, Economics. B.A. Manchester University (England), 1946; M S., University of London, 1949; Ph.D., University of Chicago, 1951.

Misner, Charles W., Professor, Physics and Astronomy B S. University of Notre Dame, 1952; M A., Princeton University, 1954; Ph.D., 1957

Misonger, Julie M., Instructor, Part-Time, Housing and Applied Design B F.A., Ohio State University, 1944; M A., University of Maryland, 1967

Mitchell, Robert D., Associate Professor Geography M A University of Glasgow, 1962; Ph D University of Wisconsin 1968

Mityga, Henry G., Instructor Institute of Applied Agriculture B S Cornell University, 1966; M S Purdue University, 1969

Mitzel, Margaret A., Lecturer, Part-Time, Measurement and Statistics B S., Towson State College, 1940; M Ed Johns Hopkins University, 1944; Ph D University of Maryland 1969

Mobley, Joyce D., Lecturer, Afro-American Studies B A Florida Agricultural and Mechanical University, 1962; M A University of California (Los Angeles), 1963

Mohanty, Sashi B., Professor Veterinary Science B V S Bihar University, 1956; M S University of Maryland 196* Ph D 1963

Montgomery, William L., Associate Professor Music B Mus., Cornell College 1953; M Mus., Catholic University of America 1957; Ph D., 1975

Moore, John H., Jr., Associate Professor Chemistry B S Carnegie Institute of Technology 1963; M A Johns Hopkins University 1965; Ph D 1967

Moore, John R., Professor Agricultural and Resource Economics. B.S., Ohio State University 1951; M.S., Cornell University 1955; Ph.D University of Wisconsin, 1959

Moore, Michael R., Assistant Professor Speech and Dramatic Art B.S., Southern Illinois University 1966; M A University of Missouri, 1970; Ph D., 1973

Moore, Robert H., Assistant Professor, English A B., Davidson College, 1962; M.A., University of North Caroline 1964; Ph.D University of Wisconsin, 1971

Morash, Edward A., Lecturer, College of Business and Management B A., Northeastern University 1968; M B A University of Maryland 1971

Morgan, Delbert T., Professor Botany B S Kent State University 1940; M A Columbia University, 1942; Ph.D 1948

Morgan, H. Gerthon, Professor and Chairman, Institute for Child Study B A., Furman University, 1940; M A University of Chicago, 1943; Ph D., 1946

Morgan, Omar D., Professor Botany B Ed Illinois State University (Normal), 1940; Ph D University of Illinois (Urbana), 1950.

Morris, John L., Extension Associate Professor Dairy Science. B.S., Iowa State University 1943; M.S., University of Delaware, 1958

Morris, J. Anthony, Lecturer, Part-Time, Microbiology B.S., Catholic University of America, 1940; M.S., 1942; Ph.D. 1947

Morris, Russell D., Lecturer, Part-Time, College of Business and Management. B.S.C., Ohio State University 1963; M B A., 1964; Ph.D., 1973.

Morse, Douglass H., Professor, Zoology B.S. Bates College, 1960; M S., University of Michigan, 1962; Ph.D. Louisiana State University, 1965.

Morse, Frederick H., Associate Professor, Mechanical Engineering B.S., Rensselaer Polytechnic Institute, 1957; M.S., Massachusetts Institute of Technology, 1959; Ph.D., Rensselaer Polytechnic Institute, 1969

Morton, Eugene S., Visiting Assistant Professor, Part-Time, Zoology B.S., Denison University, 1962; M.S., Yale University, 1966; Ph.D., 1969.

Morton, John E., Assistant Professor, Economics. B A. Yale University, 1965; M A., University of Michigan, 1967; Ph.D., 1970.

Moss, Alfred A., Lecturer, History B A. Lake Forest College, 1965; M.Div., Episcopal Divinity School, 1968; M A., University of Chicago, 1972.

Moss, Lawrence K., Professor, Music. B.A. University of California (Los Angeles), 1949; M A University of Rochester, 1950; Ph.D., University of Southern California, 1957.

Motta, Jerome J., Associate Professor Botany. A.B., San Francisco State College, 1959; M.A., 1964; Ph.D., University of California (Berkeley), 1968

Mucci, Anthony G., Assistant Professor Mathematics B A University of Pennsylvania, 1961; M.A., 1964; Ph.D., University of California (Irvine), 1971.

Mueller, Marian C., Instructor, Music B.S., West Texas State University, 1944; M.Ed., University of Maryland, 1965.

Mulchi, Charles L., Associate Professor, Agronomy B.S., North Carolina State University, 1964; M.S., 1967; Ph.D., 1970.

Muller, Edward K., Assistant Professor, Geography B.A. Dartmouth College, 1965; M A University of Wisconsin, 1968; Ph.D. 1972.

Mullinazzi, Thomas E., Assistant Professor, Civil Engineering B.S., Notre Dame, 1964; M S., Purdue University, 1966; Ph.D., 1973

Munn, Robert J., Professor, Chemistry, Assistant Dean for Pre-Medical Advising B Sc. University of Bristol, 1967; Ph.D., 1961

Munno, Frank J., Professor, Chemical Engineering. B.S., Waynesburg College, 1957; M.S., University of Florida, 1962; Ph.D., 1964

Murphy, Charles D., Professor, English. B.A., University of Wisconsin, 1929; M.A., Harvard University, 1930; Ph.D., Cornell University, 1940

Murphy, Thomas J., Associate Professor, Chemistry. Bach., Fordham University, 1963; Ph.D., Rockfeller University, 1968

Murphy, Thomas P., Professor, Government and Politics, Director, Institute for Urban Studies. B.A., Queens College, 1952; M.A., Georgetown University, 1960; Ph.D., Saint John's University, 1963

Murray, Joseph F., Instructor, Physical Education. B.S., University of Maryland, 1967; M.A., 1969.

Murray, Ray A., Professor, Agricultural and Resource Economics. B.S., University of Nebraska, 1934; M.A., Cornell University, 1938; Ph.D., 1949

Myers, Ralph D., Professor, Physics and Astronomy. B.A., Cornell University, 1934; M.A., 1935; Ph.D., 1937.

Myers, Robert M., Professor, English. B.A., Vanderbilt University, 1941; M.A., Columbia University, 1942; M.A., Harverd University, 1943; Ph.D., Columbia University, 1948

Myricks, Norman, Associate Professor, Family and Community Development. B.A., San Francisco State University, 1955; M.S., 1967; J.D., Howard University, 1970; Ed.D., American University, 1974.

Nagatani, Nora M., Instructor, Speech and Dramatic Art. B.A., University of Hawaii, 1967; M.A., University of Wisconsin, 1969.

Naranjo, Carmen, Visiting Lecturer, Food, Nutrition and Institution Administration. B.S., University of Puerto Rico, 1965; MHCA, Baylor University, 1973.

Nash, Allan N., Professor, College of Business and Menagement. B.B.A., University of Minnesota, 1957; M.A., 1959, Ph.D., 1963

Natella, Arthur A., Assistant Professor, Spanish and Portuguese. B.A., Columbia University, 1963; M.A., Syracuse University, 1965, Ph.D., 1970.

Ndissi, Chacha E., Lecturer, Afro-American Studies. B.A., Goshen College, 1966, M.A., Howard University, 1968.

Needle, Richard H., Assistant Professor, Health Education. B.S., Temple University, 1964, M.Ed., University of Toledo, 1967, Ph.D., University of Maryland, 1973.

Nelson, Clifford L., Professor, Agricultural and Extension Education. B.S., Washington State University, 1957; M.S., 1962; Ph.D., University of Minnesota, 1966.

Nelson, William E., Assistant Professor, Housing and Applied Design. B.S., University of Bridgeport, 1965; M.S., Floride State University, 1968.

Nemes, Graciela P., Professor, Spanish and Portuguese. B.S., Trinity College (Vermont), 1942; M.A., University of Maryland, 1946; Ph.D., 1952.

Neri, Umberto, Associate Professor, Mathematics. B.S., University of Chicago, 1961, M.S., 1962; Ph.D., 1966

Neuman, Ronald H., Assistant Professor, College of Business and Management. B.S., University of Maryland, 1963, J.D., 1967; LL.M., Georgetown University, 1973.

Neumann, Walter, Assistant Professor, Mathematics. B.A., Adelaide University (Australia), 1966, M.A., 1968, Ph.D., University of Bonn (West Germany), 1969.

Newby, Hayes A., Professor and Chairman, Hearing and Speech Sciences. A.B., Ohio Wesleyan University, 1935, M.A., University of Iowa, 1939, Ph.D., 1947.

Newcomb, Robert W., Professor, Electrical Engineering. B.S., Purdue University, 1955; M.S., Stenford University, 1957, Ph.D., University of California (Berkeley), 1960.

Newcomer, Joseph L., Senior Specialist, Agronomy. B.S., University of Maryland, 1950, M.S., 1955.

Newell, Clarence A., Professor, Administration, Supervision and Curriculum. B.A., Hastings College, 1935, M.A., Columbie University, 1939, Ph.D., 1943.

Newsom, D. Earl, Professor, College of Journalism. B.S., Oklahoma State University, 1948, M.S.J., Northwestern University, 1949, Ed.D., Oklahome State University, 1957.

Ng, Wing-Chiu, Visiting Assistent Professor, Physics and Astronomy. B.S., Yale University, 1969, M.S., 1969, Ph.D., New York University, 1972.

Nicholas, Francis W., Lecturer, Geography. B.Ed., University of Nebraske, 1964, B.A., University of Maryland, 1966, M.A., 1971, Ph.D., 1974

Nicholson, James L., Senior Specialist, Poultry Science. B.S., University of Maryland, 1951.

Nickels, William G., Associate Professor, College of Business and Management. B.S.B.A., Ohio State University, 1962, M.B.A., Western Reserve University, 1966, Ph.D., Ohio State University, 1969.

Nicklason, Fred H., Assistant Professor, History. B.S., Gustavus Adolphus College, 1953, M.A., University of Pennsylvenia, 1955, Ph.D., Yale University, 1967

Niebur, Douglas P., Assistant Professor, Mathematics. B.S. Iowa State University, 1963, M.S., University of Wisconsin, 1965, Ph.D., 1968

Niemeyer, G. Charles, Associate Professor, Speech and Dramatic Art. B.A., Depauw University, 1933, M.A., Northwestern University, 1935; Ph.D., Yale University, 1942

Niese, Henry E., Associate Professor, Art. B.F.A., Columbie University, 1955.

Niles, Lyndrey A., Lecturer, Part-Time, Speech and Dramatic Art. B.A., Columbia Union College, 1963; M.A., University of Maryland, 1964, Ph.D., Temple University, 1973.

Noll, Jacqueline A., Instructor, Part-Time, English. B.A., Southern Illinois University, 1970; M.A., 1972

Noll, James W., Associate Professor, Social Foundations of Education. B.S., University of Wisconsin, 1954, M.S., 1961; Ph.D., University of Chicago, 1965.

Noonan, Robert E., Assistent Professor, Computer Science. A.B., Providence College, 1966; M.S., Purdue University, 1968, Ph.D., 1971.

Norman, Kent L., Assistent Professor, Psychology. B.A., Southern Methodist University, 1969, M.A., University of Iowa, 1971, Ph.D., 1973.

Noss, Jerome R., Lecturer, Physical Education. B.S., Bowling Green State University, 1956, M.S., Ohio State University, 1958.

Nutku, Emily B., Assistant Professor, English. A.B., San Jose State College, 1941; M.A., University of California (Berkeley), 1943, Ph.D., 1966.

Nzuwah, Mariyo M., Assistant Professor and Acting Director, Afro-American Studies. B.A., University of Minnesota, 1965; M.A., Howard University, 1967; Ph.D., 1974

O'Connell, Donald W., Vice President for General Administretion; Professor, Economics. B.A., Columbia University, 1937; M.A., 1938; Ph.D., 1953

Odell, Stanley J., Assistent Professor, Philosophy. B.A., University of Kansas, 1960; M.A., University of Illinois (Urbana), 1962; Ph.D., 1967.

Odland, Sheldon W., Instructor, Housing and Applied Design. B.A., Pennsylvania State University, 1958.

Oelhaf, Robert C., Lecturer, Part-Time, Economics. B.A., Carlton College, 1960, M.A., Columbia University, 1963; B.D., Union Theological Seminary, 1965; M.A., University of Maryland, 1972.

Ogilvie, Keith W., Research Associate Professor, Part-Time, Institute for Fluid Dynamics and Applied Mathematics. B.S., University of Edinburgh, 1950; Ph.D., 1954

O'Grady, Emmett P., Assistant Professor, Electrical Engineering. B.S., Saint Louis University, 1962; M.S., University of Arizona, 1965, Ph.D., 1969.

O'Haver, Thomas C., Associate Professor, Chemistry. B.S., Spring Hill College, 1963; Ph.D., University of Floride, 1968.

Djikutu, Raimi D., Lecturer, Anthropology. B.A., University of Kansas, 1959; Diploma, Human Biology, Oxford University, Ph.D., Mainz University, West Germany, 1963.

O'Leary, Ronald T., Associate Professor, Speech and Dramatic Art. B.S., Bowling Green State University, 1960, M.A., 1961; M.F.A., University of Wisconsin, 1964, Ph.D., 1966.

Oliger, Esther V., Instructor, Part-Time, Early Childhood-Elementery Education. B.S., Seint John's College of Cleveland, 1962, M.Ed., University of Maryland, 1971.

Oliver, James H., Assistant Professor, Government and Politics. B.A., University of Washington, 1959; M.A., 1962; Ph.D., University of Wisconsin, 1968.

Olson, Charles E., Associate Professor, College of Business and Management. B.B.A., University of Wisconsin, 1964; M.S., 1966, Ph.D., 1968

Olson, Edwin E., Professor, College of Library and Information Services. B.A., Saint Olaf College, 1959, M.S., American University, 1961, Ph.D., 1966.

Olson, Keith W., Associate Professor, History. B.A., State University of New York (Albany), 1957, M.A., 1959; Ph.D., University of Wisconsin, 1964.

Olson, Mancur L., Jr., Professor, Economics. B.S., North Dakota State University, 1954, B.A., Oxford University, 1956, M.A., 1960, Ph.D., Harverd University, 1963

Olson, Orrin D., Associate Professor, Music. A.B., Sacramento State College, 1960, M.Mus., Indiana University, 1961.

Olson, Alison G., Professor, History. B.A., University of California (Berkeley), 1952, M.A., 1953, Ph.D., Oxford University (England), 1956.

Olver, Frank W., Research Professor, Mathematics and Institute for Fluid Dynamics and Applied Mathematics. B.Sc., University of London, 1945, M.Sc., 1948, D.Sc., 1961.

Onder, James J., Assistent Professor, Speech and Dramatic Art. B.F.A., Ohio University, 1962, M.S., University of Illinois (Champaign), 1964, Ph.D., University of Michigan, 1969

Oneda, Sadao, Professor, Physics and Astronomy. B.S., Tohoku University, 1946, M.Sc., 1948, Ph.D., Nagoya University, 1953

O'Neill, Leo W., Jr., Professor, Early Childhood Elementary Education. B.A., University of Chicago, 1938, M.A., University of Kansas, 1951, Ed.D., University of Colorado, 1955.

Opik, Ernst J., Professor, Physics and Astronomy. Bach., Moscow Imperial University, 1916, Ph.D., National University of Estonia, 1923

Orvedal, Ruth W., Assistant Professor, Family and Community Development. B.S., Middle Tennessee State College, 1937, M.S., University of Tennessee, 1941.

Osborn, John E., Professor, Methematics. B.S., University of Minnesota, 1948, M.S., 1963, Ph.D., 1965

Oser, Paula, Lecturer, Part-Time, Family and Community Development. B.A., University of Pennsylvania, 1959; M.S.S., Bryn Mawr College, 1964

Osterhouse, Robert A., Lecturer, Psychology. B.S., Whitworth College, 1964; M.A., Ohio State University, 1968; Ph.D., 1969

Ostrowski, Paul P., Assistent Professor, Mechanical Engineering. B.S., University of Maryland, 1963; M.Eng., McGill University, 1970; Ph.D., 1975.

Otto, Gilbert F., Visiting Professor, Zoology. B.A., Kalamazoo College, 1926; M.S., Kansas State University, 1927; Ph.D., Johns Hopkins University, 1929

Otts, Louis E., Jr., Professor, Civil Engineering. B.S., East Texas State College, 1933; B.S., Texas Agricultural and Mechanical University, 1946; M.S., 1948

Ousby, Heather D., Visiting Assistant Professor, Part-Time, English. B.A., Harvard University, 1966, Ph.D., 1972

Ousby, Ian, Assistant Professor, English. B.A., Cambridge University (England), 1968; M.A., 1972; Ph.D., Harvard University, 1973.

Owens, William R., Assistant Professor, Mechanical Engineering. B.S., Pennsylvania State University, 1959; M.S., Drexel Institute of Technology, 1964, Ph.D., University of Maryland, 1970.

Owings, James C., Associate Professor, Mathematics. B.S., Dartmouth College, 1962, Ph.D., Cornell University, 1966

O'Gallagher, Joseph J., Assistent Professor, Physics and Astronomy. S.B., Massachusetts Institute of Technology, 1961; S.M., University of Chicago, 1962, Ph.D., 1967

Paauwe, Jacob, Instructor, Part-Time, Chemical Engineering. B.S., Netherlands, 1960.

Paez, M. D., Assistant Professor, Electrical Engineering. B.S., Instituto Technologico de Monterrey, Mexico, 1959, M.S.E.E., Carnegie Institute of Technology, 1965, Ph.D., North Carolina State University, 1970

Pai, Shih I., Research Professor, Institute for Fluid Dynamics and Applied Mathematics. B.S., National Central University (China), 1935; M.S., Massachusetts Institute of Technology, 1938, Ph.D., California Institute of Technology, 1940

Paine, Frank T., Professor, College of Business and Menegement. B.S., Syracuse University, 1951; M.B.A., 1956, Ph.D., Stenford University, 1963

Panichas, George A., Professor, English. B.A., American International College, 1951, M.A., Trinity College (Connecticut), 1952, Ph.D., Nottinghsm University, 1961

Park, Robert L., Professor, Physics and Astronomy, Director Center for Materials Research. B.S., University of Texas (Austin), 1958, M.A., 1960, Ph.D., Brown University, 1964

Parming, Tonu, Lecturer, Sociology. B.A., Princeton University, 1964, M.A., Yale University, 1973.

Parochetti, James V., Associate Professor, Agronomy. B.S., University of Illinois (Urbana), 1962, M.S., Purdue University, 1964, Ph.D., 1967.

Pasch, Alan, Professor, Philosophy. B.A., University of Michigan, 1949, M.A., New School for Social Research, 1952, Ph.D., Princeton University, 1955

Pati, Jogesh C., Professor, Physics and Astronomy. B.S., Reven College, 1955, M.Sc., Delhi University, 1957, Ph.D., University of Maryland, 1960

Patterson, Glenn W., Professor, Botany. B.S., North Carolina State University, 1960, M.S., University of Maryland, 1963, Ph.D., 1964

Patterson, William V., Instructor, Speech and Dramatic Art. B.F.A., University of Oklahoma, 1970; M.F.A., University of Utah, 1972

Patton, James L., Lecturer, College of Business and Menagement. B.S., Hampden-Sydney College, 1963; M.B.A., University of Maryland, 1972

Paver, Dennis S., Instructor, Speech and Dramatic Art. B.S., Saint Cloud State College, 1967; M.F.A., Ohio State University, 1971.

Pavey, Stanley, Associate Professor, Psychology, Counselor, Counseling Center. B.A., City University of New York (City College), 1952; M.S., 1955, Ph.D., Ohio State University, 1961

Payerle, Laszlo M., Assistant Professor, Music. B.Mus., University of Maryland, 1960; M.Mus., University of Texas, 1962

Pearce, Alan, Lecturer, Part-Time, College of Business and Management. B.Sc., London School of Economics, 1963; M.Sc., 1968, Ph.D., Indiana University, 1972

Pearl, Martin A., Professor, Mathematics. B.A., City University of New York (Brooklyn College), 1950; M.A., University of Michigan, 1951, Ph.D., University of Wisconsin, 1955

Pease, John, Associate Professor, Sociology. B.S., Western Michigan University, 1960; M.A., Michigan State University, 1963, Ph.D., 1968

Pechacek, Robert E., Associate Professor, Part-Time, Physics and Astronomy. B.S., California Institute of Technology, 1954; M.S., University of California (Berkeley), 1963, Ph.D., 1966

Pelczar, Michael J., Jr., Professor, Microbiology, Vice President for Graduate Studies and Research. B.S., University of Maryland, 1936; M.S., 1938, Ph.D., University of Iowa, 1941

Pemberton, Elizabeth G., Associate Professor, Art. B.A., Mount Holyoke College, 1961; M.A., Columbia University, 1964, Ph.D., 1968

Pennington, Kenneth D., Associate Professor, Music. B.A., Friends University, 1949; B.Mus., 1950; M.A., New York University, 1953; D.Mus., Indiana University, 1961

Pennington, Neil, Lecturer, Part-Time, Music. B.A., University of New Mexico, 1972

Perinbam, B. Marie, Assistant Professor, History. B.A., London University, 1955; M.A., University of Toronto, 1959; Ph.D., Georgetown University, 1969

Perkins, Hugh V., Professor, Institute for Child Study. A.B., Oberlin College, 1941; M.A., University of Chicago, 1946; Ph.D., 1949; Ed.D., New York University, 1956

Perkins, Moreland, Professor, Philosophy. A.B., Harvard University, 1948; A.M., 1949; Ph.D., 1953

Perloff, Marjorie G., Professor, English. B.A., Bernard College, 1953; M.A., Catholic University of America, 1956; Ph.D., 1965

Peroff, Kathleen S., Lecturer, Government and Politics. B.A., Holy Names College, 1969; M.A., University of Wisconsin (Madison), 1970

Perrin, Donald G., Professor, Administration, Supervision and Curriculum. A.B., University of Southern California, 1960; A.M., 1962, Ph.D., 1969

Peters, Robert M., Associate Professor, Secondary Education. B.S., Mankato State College, 1955; M.S., 1958, Ph.D., University of Minnesota, 1965

Peterson, Frederick M., Assistant Professor, Economics. B.S., University of California (Berkeley), 1964; Ph.D., Princeton University, 1972

Peterson, William S., Associate Professor, English. B.A., Walla Walla College, 1961; M.A., University of Wisconsin, 1962, Ph.D., Northwestern University, 1968

Petrick, Michael J., Associate Professor, College of Journalism. B.S., University of Wisconsin (Milwaukee), 1965; M.S., 1967, Ph.D., 1970.

Pfaehler, William L., Senior Instructor, Fire Service Extension. B.A., Rutgers — The State University, 1956.

Pfaffenberger, Roger C., Associate Professor, College of Business and Management. B.S., California State Polytechnic College, 1965; M.S., Texas Agricultural and Mechanical University, 1968; Ph.D., 1971.

Pfister, Guenter G., Associate Professor, Secondary Education and Germanic and Slavic Languages. B.S., Bowling Green State University, 1963; M.A., Michigan State University, 1965, Ph.D., University of Kansas, 1970.

Phillips, Warren R., Professor, Government and Politics. B.A., Northwestern University, 1963; M.S., California State University (San Francisco), 1966; Ph.D., University of Hawaii, 1969.

Piacsek, Steven A., Lecturer, Part-Time, Meteorology. B.S., University of Notre Dame, 1958; M.S., Massachusetts Institute of Technology, 1961, Ph.D., 1966.

Piaewonsky, Bernard H., Lecturer, Part-Time, Aerospace Engineering. B.S., Massachusetts Institute of Technology, 1953; M.A., Indiana University, 1954; M.S.E., Princeton University, 1956; M.A., 1959, Ph.D., 1961.

Pickard, Hugh B., Professor, Chemistry. A.B., Haverford College, 1933; Ph.D., Northwestern University, 1938.

Pierce, Sidney K., Jr., Associate Professor, Zoology. B.Ed., University of Miami, 1966; Ph.D., Florida State University, 1970.

Pinnell, Patrick L., Lecturer, School of Architecture. B.A., Yale University, 1971; M.Arch., 1974

Piper, Don C., Professor, Government and Politics. B.A., University of Maryland, 1954; M.A., 1958; Ph.D., Duke University, 1961

Piper, Harry W., Associate Professor, Civil Engineering. B.Arch., Catholic University of America, 1940; M.C.E., 1960

Piper, Rowena W., Instructor, Zoology. B.S., Midwestern University, 1954; M.A., Duke University, 1962

Pirages, Dennis C., Associate Professor, Government and Politics. B.A., State University of Iowa, 1964; Ph.D., Stanford University, 1969.

Pitt, David G., Assistant Professor, Horticulture. B.A., State University of New York (Syracuse), 1970; M.L.A., University of Massachusetts, 1974

Plischke, Elmer, Professor, Government and Politics. Ph.B., Marquette University, 1937; M.A., American University, 1938; Ph.D., Clark University, 1943

Plotkin, Allen, Associate Professor, Aerospace Engineering. B.S., Columbia University, 1963; M.S., 1964; Ph.D., Stanford University, 1968.

Plunka, Gene A., Instructor, Part-Time, English. B.A., University of Maryland (Baltimore County), 1971; M.A., University of Maryland (College Park), 1972.

Podwysocki, Melvin, Lecturer, Part-Time, Geology. B.S., Wayne State University, 1966; M.S., Pennsylvania State University, 1968; Ph.D., 1974

Poffenberger, Paul R., Professor, Agricultural and Resource Economics, Acting Chairman, Agricultural and Extension Education, Associate Dean, College of Agriculture. B.S., University of Maryland, 1935; M.S., 1937; Ph.D., American University, 1953

Poist, Richard F., Assistant Professor, College of Business and Management. B.S., Pennsylvania State University, 1965; M.B.A., University of Maryland, 1967; Ph.D., Pennsylvania State University, 1972.

Ponnamperuma, Cyril A., Professor, Chemistry. B.A., University of Madras, 1948; B.Sc., University of London, 1959; Ph.D., University of California (Berkeley), 1962.

Poplai, Bina B., Assistant Professor, Food, Nutrition and Institution Administration. B.A., Punjab University (India), 1949; M.S., Baroda University (India), 1966; Ph.D., Texas Women's University, 1971.

Portella, John L., Lecturer, Part-Time, Family and Community Development. B.A., University of Pittsburgh, 1970; M.A., University of Maryland, 1974

Portz, John, Associate Professor, English, Director of the Honors Program. B.S., Duke University, 1937; M.A., Harvard University, 1941; Ph.D., 1958

Postbrief, Samuel, Assistant Professor, Government and Politics. A.B., City College of New York (Brooklyn College), 1969; M.A., Indiana University, 1971; Ph.D., 1975.

Potash, Esther B., Instructor, English. B.A., University of Maryland, 1967; M.A., 1970.

Pote, Valarie A., Instructor, Health Education. B.S., Saint Cloud State College, 1972; M.S., Central Missouri State University, 1974

Pottala, Ann E., Lecturer, Part-Time, Electrical Engineering. B.A., Indiana University, 1963; M.S., University of Maryland, 1971.

Pottala, E. W., Lecturer, Electrical Engineering. B.S.E.E., Worcester Polytechnic Institute, 1961; M.Eng., Yale University, 1963, Ph.D., University of Maryland, 1970.

Potter, Jane H., Associate Professor, Zoology. B.S., University of Chicago, 1942; M.S., 1947; Ph.D., 1949.

Potts, William D., Lecturer, Part-Time, School of Architecture. B.S., University of Arizona, 1960; B.Arch., 1966.

Potts, William H., Jr., Associate Professor, School of Architecture. B.Arch., University of Florida, 1951; M.A., Harvard University, 1956.

Powell, Thomas H., Lecturer, Part-Time, Institute of Applied Agriculture.

Prange, Gordon W., Professor, History. B.A., State University of Iowa, 1932; M.A., 1934; Ph.D., 1937.

Prange, Richard E., Professor, Physics and Astronomy. B.S., University of Chicago, 1955; Ph.D., 1957.

Prather, Elizabeth S., Professor and Chairman, Food, Nutrition and Institution Administration. B.S., Auburn University, 1951; M.S., 1955; Ph.D., Iowa State University, 1963

Previti, John J., Instructor, Part-Time, Industrial Education. B.A., Trenton State College, 1970; M.A., University of Maryland, 1975.

Procopiow, Norma, Visiting Lecturer, English. B.A., Marymount College, 1952; M.A., Catholic University of America, 1962; Ph.D., 1974

Pugh, Howel G., Professor, Physics and Astronomy. B.A., Cambridge University, 1955; M.A., 1961; Ph.D., 1961.

Pugliese, Rudolph E., Professor, Speech and Dramatic Art. B.A., Miami University (Ohio), 1947; M.A., Catholic University of America, 1949; Ph.D., Ohio State University, 1961

Pugsley, James H., Associate Professor, Electrical Engineering. A.B., Oberlin College, 1958; M.S., University of Illinois (Urbana), 1958; Ph.D., 1963

Pumroy, Donald K., Professor, Counseling and Personnel Services. B.A., State University of Iowa, 1949; M.S., University of Wisconsin, 1951; Ph.D., University of Washington, 1954

Purdy, William C., Professor, Chemistry. A.B., Amherst College, 1951; Ph.D., Massachusetts Institute of Technology, 1955.

Puryear, Martin, Lecturer, Art. B.A., Catholic University, 1963; M.F.A., Yale University, 1971

Quigley, George D., Associate Professor Emeritus, Poultry Science, Director Emeritus, Institute of Applied Agriculture. B.S., Michigan State University, 1925.

Quynn, William F., Professor Emeritus, French and Italian. B.A., University of Virginia, 1922; M.A., 1923; Ph.D., The Johns Hopkins University, 1934

Raben, Charles S., Lecturer, Part-Time, College of Business and Management. B.A., Fairleigh-Dickinson University, 1969; M.A., Ohio State University, 1970; Ph.D., 1973

Rado, George T., Professor, Part-Time, Physics and Astronomy. S.B., Massechusetts Institute of Technology, 1939; S.M., 1941; Ph.D., 1943

Rafel, Alan, Lecturer, Part-Time, Dance. B.A., University of Maryland, 1969

Ragan, Robert M., Professor, Civil Engineering. B.S.C.E., Virginia Military Institute, 1955; M.S., Massachusetts Institute of Technology, 1959, Ph.D., Cornell University, 1965.

Rajan, Jai Raj N., Lecturer, Part-Time, Civil Engineering. B.S., Lucknow University (India), 1953; B.S., Roorkee University (India), 1956; M.S., Duke University, 1962; Ph.D., 1967.

Ranald, Ralph A., Associate Professor, Government and Politics. A.B., University of California (Los Angeles), 1952; M.A., 1954; A.M., Princeton University, 1958; Ph.D., 1961

Rand, Marquerite, Professor Emerita, Spanish and Portuguese. B.A., Pomona College, 1919; M.A., Stanford University, 1921; Ph.D., University of Chicago, 1951.

Rao, Thammavarapu R., Professor, Electrical Engineering. B.Sc., Government Arts College, Andhra University, 1952; D.L.I.Sc., Indian Institute of Science, Banagalore, India, 1955; M.S., University of Michigan, 1961; Ph.D., 1964.

Rappleye, Robert D., Associate Professor, Botany. B.S., University of Maryland, 1941; M.S., 1947; Ph.D., 1949.

Rather, John C., Lecturer, Part-Time, College of Library and Information Services. B.A., Amherst College, 1942; M.S., Columbia University, 1951.

Ray, Philip B., Associate Professor, Counseling and Personnel Services; Counselor, Counseling Center. B.A., Antioch College, 1950; M.S., University of Pennsylvania, 1955; Ph.D., University of Minnesota, 1962.

Razar, Michael J., Assistant Professor, Mathematics. A.B., Harvard University, 1965; Ph.D., 1971.

Reaka, Marjorie L., Assistant Professor, Zoology. B.A., University of Kansas, 1965; M.S., 1967; Ph.D., University of California (Berkeley), 1975.

Rearick, William R., Professor, Art. B.A., New York University, 1953; M.A., 1955; Ph.D., Harvard University, 1961.

Rebuck, Ernest C., Visiting Assistant Professor, Agricultural Engineering. B.S.A.E., Pennsylvania State University, 1966; M.S., 1967; Ph.D., University of Arizona, 1972.

Reckers, Philip M. J., Lecturer, College of Business and Management. B.S., Quincy College, 1968; M.B.A., Washington University (Saint Louis), 1972.

Redding, H. Richard, Lecturer, Part-Time, Physical Education. B.S., Springfield College, 1940.

Redish, Edward F., Associate Professor, Physics and Astronomy. A.B., Princeton University, 1963; Ph.D., Massachusetts Institute of Technology, 1968.

Rees, Charles R., Instructor, Physical Education. B.Ed., University of London Institute of Education, 1970; M.A., University of Maryland, 1972

Reeve, E. Wilkins, Professor, Chemistry. B.S., Drexel Institute of Technology, 1936; Ph.D., University of Wisconsin, 1940.

Reeves, Mavis M., Associate Professor, Government and Politics. B.A., West Virginia University, 1942; M.A., 1943, Ph.D., University of North Carolina, 1947.

Regan, Thomas M., Professor, Chemical Engineering. B.S., Tulane University of Louisiana, 1963, Ph.D., 1967.

Reggy, M. A., Instructor, English. B.A., Douglass College, 1963; M.A.T., Howerd University, 1970.

Reichelderfer, Charles F., Associate Professor, Entomology B.S., Saint Cloud State College, 1961; M.A., University of Washington, 1963; Ph.D., University of California (Riverside), 1968.

Reid, James E., Assistant Professor, Art. B.F.A., Maryland Institute of Art, 1966, M.A., University of Maryland, 1970.

Reinhart, Bruce L., Professor, Mathematics. B.A., Lehigh University, 1952; M.A., Princeton University, 1954, Ph.D., 1956.

Reiser, Martin P., Professor, Physics and Astronomy and Electrical Engineering. B.Sc., Johannes Gutenberg University, 1957; Ph.D., 1960.

Rentz, Marie S., Instructor, Spanish and Portuguese. A.B., University of North Carolina, 1947, M.A., Duke University, 1951.

Reveal, James L., Associate Professor, Botany. B.S., Utah State University, 1963, M.S., 1965, Ph.D., Brigham Young University, 1969.

Reynolds, Charles W., Professor, Horticulture. B.A., University of Alabama, 1941, B.S., Auburn University, 1947, M.S., 1949, Ph.D., University of Maryland, 1954

Reynolds, Michael M., Professor, College of Library and Information Services. B.A., Hunter College, 1950; M.S.L.S., Columbia University, 1952, M.A., American University, 1954, Ph.D., University of Michigan, 1964

Rhee, Moon-Jhong, Associate Professor, Electrical Engineering. B.S., 1958, M.S., Catholic University of America, 1960; Ph.D., 1970.

Rheinboldt, Werner C., Professor, Computer Science and Mathematics. M.A., University of Heidelberg (Germany), 1952; Ph.D., University of Freiburg I. Br. (Germany), 1955.

Rhoads, David J., Associate Professor, Counseling and Personnel Services. B.A., Temple University, 1954, M.A., 1958; Ed.D., University of Maryland, 1963.

Rib, Harold T., Visiting Professor, Part-Time, Civil Engineering. B.C.E., City College of New York, 1953, M.S., Cornell University, 1957, Ph.D., Purdue University, 1967

Ribalta, Pedro J., Lecturer, Housing and Applied Design. Bach., Barcelona University, 1959, M.F.A., University of Maryland, 1975.

Ricci, Frederick, Assistant Professor, Secondary Education. B.S., Bryant College, 1964, M.Ed., Boston University

Richard, Jean-Paul, Associate Professor, Physics and Astronomy. B.A., Laval University, 1956, B.S., 1960, Ph.D., University of Paris, 1963

Richards, Mary L., Instructor, Textiles and Consumer Economics. B.S., Michigan State University, 1970; M.A. 1975.

Rickert, Walter K., Lecturer, Industrial Education. M.S., Princeton University, 1949

Ridgway, Whitman H., Assistant Professor, History. A.B., Kenyon College, 1963, M.A., San Francisco State College, 1967, Ph.D., University of Pennsylvania, 1973.

Ridky, R. W., Assistant Professor, Secondary Education and Geology. B.S., State University of New York, 1966, M.S., Syracuse University, 1970; Ph.D., 1973.

Rieger, Charles J., III, Assistant Professor, Computer Science. B.S., Purdue University, 1970, Ph.D., Stanford University, 1973

Rinzel, John M., Lecturer, Part-Time, Mathematics. B.S., University of Florida, 1967, M.S., New York University, 1968, Ph.D., 1973

Risinger, Robert, Professor and Chairman, Secondary Education. B.S., Ball State University, 1940; M.A., University of Chicago, 1947, Ed.D., University of Colorado, 1955.

Riskind, John H., Assistant Professor, Psychology. B.A., University of Texas, 1970; M.S., Yale University, 1974, Ph.D., 1975.

Ritzer, George, Professor, Sociology. B.A., City College of New York, 1962; M.A., University of Michigan, 1964, Ph.D., Cornell University 1968

Ritzmann, Barbara J., Assistant Professor, Housing and Applied Design. B.S., Pennsylvania State University, 1945; M.F.A., George Washington University, 1966.

Rivard, C. E., Instructor, Agronomy. B.S., Michigan State University, 1966, M.S., University of Maryland, 1970.

Rivello, Robert M., Professor, Aerospace Engineering. B.S. University of Maryland, 1943; M.S., 1948.

Roach, Lucinda M., Instructor, Early Childhood Elementary Education. A.B., Mount Holyoke College, 1966, M.S., Bank Street College of Education, 1969.

Roberson, Bob S., Associate Professor, Microbiology. B.A., University of North Carolina, 1951; Ph.D., 1960

Roberts, Merrill J., Professor, College of Business and Management. B.A., University of Minnesota, 1938, M.B.A., University of Chicago, 1939; Ph.D., 1951.

Robeson, Franklin E., Assistant Professor, College of Business and Management. B.B.A., University of Cincinnati, 1968, M.B.A., Indiana University, 1970, D.B.A., 1972

Robinson, David J., Lecturer, Part-Time, College of Business and Management. B.S., United States Naval Academy, 1968, M.S., United States Naval Postgraduate School, 1969

Robinson, Eugene S., Instructor, Speech and Dramatic Art. B.A., University of Maryland, 1973, M.A., 1975.

Rodenhuis, David R., Associate Professor, Meteorology

Roderick, Jessie A., Associate Professor, Early Childhood Elementary Education. B.S., Wilkes College, 1956, M.A., Columbia University, 1957; Ed.D., Temple University, 1967.

Roesner, Edward H., Assistant Professor, Music. B.M., University of Cincinnati, 1962, M.M., 1964, Ph.D., New York University, 1974

Roesner, Linda C., Lecturer, Part-Time, Music. B.S., State University of New York (Potsdam), 1962, M.A., University of Washington, 1964, Ph.D., New York University, 1973

Rogers, Benjamin L., Professor, Horticulture. B.S., Clemson University, 1943, M.S., University of Minnesota, 1947; Ph.D., University of Maryland, 1950.

Rogers, Percy C., Lecturer, Part-Time, Institute of Criminal Justice and Criminology. B.A., University of California (Berkeley), 1959, M.S., Michigan State University, 1965; M.P.A., University of Southern California, 1972; D.P.A., 1973.

Rogolsky, Saul, Associate Professor, Institute for Child Study B.S., Harvard University, 1948; M.S., University of Chicago, 1953; Ed.D., Harvard University, 1963.

Rollinson, Carl L., Professor, Chemistry. B.S., University of Michigan, 1933, Ph.D., University of Illinois (Urbana), 1939.

Rooney, Lynn A., Instructor, Dance. B.F.A., University of Utah, 1971.

Roos, Philip G., Professor, Physics and Astronomy. B.A., Ohio Wesleyan University, 1960; Ph.D., Massachusetts Institute of Technology, 1964

Roper, James B., Assistant Professor, Housing and Applied Design. B.S., East Carolina College, 1961, M.A., 1963.

Rose, Harry J., Jr., Visiting Professor, Part-Time, Chemistry B.S., Saint Francis College, 1948, M.S., University of Maryland, 1952

Rose, William K., Associate Professor, Physics and Astronomy A.B., Columbia University, 1957, Ph.D., 1963.

Rosen, Meriam L., Associate Professor, Dance. B.S., University of Illinois (Urbana), 1948, M.A., University of Maryland, 1965.

Rosen, Stephen I., Associate Professor, Anthropology; Assistant Provost, Division of Behavioral and Social Sciences. B.A., University of Southern California, 1965; Ph.D., University of Kansas, 1969.

Rosenberg, Morris, Visiting Professor, Sociology. B.A., Brooklyn College, 1946; M.A., Columbia University, 1950, Ph.D., 1953.

Rosenberg, Theodore J., Research Professor, Institute for Fluid Dynamics and Applied Mathematics. B.E.E., City University of New York (City College), 1960, Ph.D., University of California (Berkeley), 1965.

Rosenfeld, Azriel, Research Professor, Computer Science B.A., Yeshiva University, 1950; M.S., Yeshiva University, 1954, Ph.D., Columbia University, 1957.

Rosenfield, Leonora C., Professor, French and Italian. B.A., Smith College, 1930, M.A., Columbia University, 1931; Ph.D., 1940.

Ross, David S., Assistant Professor, Agricultural Engineering B.S., Pennsylvania State University, 1969; M.S., 1971; Ph.D., 1973

Ross, Martha J., Lecturer, Part-Time, History. B.A., Alabama College for Women, 1945.

Roswell, Charles A., Assistant Professor, Geography. B.A., Johns Hopkins University, 1963, M.A., University of Maryland, 1969, Ph.D., 1974.

Rothgeb, Russell G., Professor Emeritus, Agronomy. B.S., University of Maryland, 1924, M.S., Iowa State College, 1925, Ph.D., University of Maryland, 1928.

Roush, Marvin L., Associate Professor, Chemical Engineering and Physics and Astronomy. B.Sc., Ottawa University, 1956, Ph.D., University of Maryland, 1964

Rovelstad, Howard, Professor and Director Emeritus, Library. B.A., University of Illinois (Urbana), 1936, M.A., 1937, B.S.L.S., Columbia University, 1940

Rovner, Philip, Associate Professor, Spanish and Portuguese B.A., George Washington University, 1948, M.A., 1949, Ph.D., University of Maryland, 1956

Rowan, Nancy S., Instructor, Part-Time, Chemistry. A.B., Mount Holyoke College, 1968, Ph.D., Boston University, 1973

Rowan, Robert, Assistant Professor, Chemistry. B.A., Pomona College, 1968, M.A., Harvard University, 1970, Ph.D., 1974

Rubin, Roger H., Assistant Professor, Family and Community Development. B.A., City University of New York (Brooklyn College), 1965; M.A., Pennsylvania State University, 1966, Ph.D., 1970.

Rubin, Sharon G., Lecturer, Part-Time, American Studies Program. B.A., University of Chicago, 1965; M.A., 1966, Ph.D., 1972

Ruchkin, Judith P., Assistant Professor, Secondary Education; Associate Director, Office of Laboratory Experiences. B.A., Swarthmore College, 1956, M.A., Yale University, 1957, Ed.D., Columbia University, 1971

Ruderman, David B., Assistant Professor, History. B.A., City College of New York, 1968; M.A., Columbia University, 1968, Ph.D., Hebrew University of Jerusalem, 1975.

Rundell, Walter, Jr., Professor and Chairman, History. B.S., University of Texas, 1951, M.A., American University, 1955, Ph.D., 1957.

Russell, Camilla P., Instructor, Part-Time, French and Italian. Laur., Padua University (Italy), 1960

Russell, Charles C., Assistant Professor, French and Italian B.A., Oberlin College, 1956, M.A., Bryn Mawr College, 1964, Ph.D., Harvard University, 1970.

Russell, John D., Professor, English. A.B., Colgate University 1951, M.A., University of Washington, 1956, Ph.D., Rutgers — The State University, 1959

Rutelli, Giovanni P., Professor Emeritus, Electrical Engineering. Ph.D. (Physics), University of Palermo (Italy), 1923, Ph.D. (E.E.), Polytechnic Institute of Turin (Italy), 1928, Libera Docenza, Rome, 1947.

Ruth, John N., Visiting Lecturer, Part-Time, Textiles and Consumer Economics. B.S., Johns Hopkins University, 1964, J.D., University of Maryland, 1968

Rutherford, Charles S., Assistant Professor, English. B.A., Carleton College, 1962, M.A., Indiana University, 1966, Ph.D., 1970

Ryden, Einar R., Professor, Part-Time, Agricultural and Extension Education. B.A., Augsburg College, 1929, Ph.D., Northwestern University, 1947.

Ryder, Mark, Associate Professor, Dance.

Rymer, Victoria S., Lecturer, College of Business and Management. B.S., University of Maryland, 1961, M.B.A., 1966

Saczalski, Kenneth, Lecturer, Part-Time, Aerospace Engineering. B.S.M.E., University of Miami, 1963, M.S., University of Rochester, 1967, Ph.D., University of Wisconsin, 1970

Sakurai, Kimtomo, Visiting Associate Professor, Institute for Fluid Dynamics and Applied Mathematics. B.S., Kyoto University (Japan), 1956, M.S., 1958, Ph.D., 1964

Salak, Marilyn M., Instructor, Part-Time, Housing and Applied Design. B.S., Hiram College, 1961, M.A., Western Reserve University, 1963

Salamanca, Jack H., Professor, English. Grad., Royal Academy of Dramatic Art (London), 1952, Dipl., University of London, 1953, Licentiate, Graduate School of Drama (Royal Academy of Music, London), 1954

Sallet, Dirse W., Associate Professor, Mechanical Engineering B.S., George Washington University, 1961, M.S., University of Kansas, 1963; Ph.D., University of Stuttgart, 1966

Samet, Hanan, Assistant Professor, Computer Science B.S., University of California (Los Angeles), 1970, M.S., Stanford University, 1974 and 1975, Ph.D., 1975.

Sampugna, Joseph, Associate Professor, Chemistry B.A., University of Connecticut, 1959, M.A., 1962, Ph.D., 1968

Samuels, Karl, Instructor, Art. B.A., Indiana University of Pennsylvania, 1967, M.F.A., Pratt Institute, 1972

Sanananda, Kuntimaddi, Visiting Assistant Professor, Mechanical Engineering. B.S., Indian Institute of Science (Bangalore), 1965, M.S., Indian Institute of Technology (Kampur), 1967, Ph.D., University of Pittsburgh, 1970

Sands, Doris W., Instructor, Health Education. B.S., Jersey City State College, 1948, M.A., University of Maryland, 1970

Sanford, Linda A., Lecturer, Part-Time, Social Foundations of Education. B.S., University of Maryland, 1970, M.A., 1973

Santa Maria, D. Laine, Associate Professor, Physical Education. B.A., University of Pennsylvania, 1962, M.Ed., Temple University, 1962, Ed.D., University of Oregon, 1968

Sarro, Ronald A., Lecturer, Part-Time, College of Journalism

Sather, Jerome O., Associate Professor, Mathematics. B.S., University of Minnesota, 1957, M.S., 1959, Ph.D., 1963

Sayani, Hasan H., Assistant Professor, Information Systems Management. B.S.E., University of Michigan, 1965, M.S.E., 1966, Ph.D., 1973

Sayre, Clifford L., Jr., Professor, Mechanical Engineering B.S., Duke University, 1947, M.S., Stevens Institute of Technology, 1950, Ph.D., University of Maryland, 1961

Schacht, Robert M., Assistant Professor, Anthropology B.S., University of Wisconsin, 1966, M.A., University of Michigan, 1968, Ph.D., 1973

Schaeffer, Harry G., Associate Professor, Aerospace Engineering B.S., University of Washington, 1958, M.S., Arizona State University, 1962, Ph.D., Virginia Polytechnic Institute, 1967

Schafer, James A., Associate Professor, Mathematics. B.S., University of Rochester, 1961, Ph.D., University of Chicago, 1965

Schafer, William D., Associate Professor, Measurement and Statistics Bech., University of Rochester, 1964, Ed.D., 1969

Schales, Franklin D., Associate Professor, Horticulture B.S., Louisiana State University, 1959, M.S., Cornell University, 1962, Ph.D., 1963

Scheips, Paul J., Lecturer, Part-Time, History B.A., Evansville College, 1942, M.A., University of Chicago, 1948, Ph.D., American University, 1966.

Schiesler, M. Antoinette, Instructor, Chemistry B.A., College of Notre Dame, 1967, M.S., University of Tennessee (Knoxville), 1968

Schilit, Howard M., Lecturer, College of Business and Management. B.A., Queens College, 1973, M.S., State University of New York (Binghamton), 1974

Schiller, Bradley R., Assistant Professor, Economics. A.B., University of California (Berkeley), 1965; Ph.D., Harvard University, 1969

Schindler, Alvin W., Professor Emeritus, Early Childhood Elementary Education B.A., Iowa State Teachers College, 1927, M.A., University of Iowa, 1929, Ph.D., 1934

Schlaretzki, Walter E., Professor, Philosophy A.B., Monmouth College, 1941, M.A., University of Illinois (Urbana), 1942, Ph.D., Cornell University, 1948

Schleidt, Wolfgang, Professor, Zoology Ph.D., University of Vienna, 1951

Schlesinger, B. Frank, Professor, School of Architecture. B.S., University of Illinois (Urbana), 1950, M.Arch., Harvard Graduate School of Design, 1954

Schlossberg, Nancy K., Professor, Counseling and Personnel Services. B.A., Bernard College, 1951, M.A., Columbia University (Teachers College), Ed.D., 1961.

Schmeissner, Joanna F., Instructor, Part-Time, English. B.A., Agnes Scott College, 1960; M.A., Yale University

Schmidt, Dieter S., Assistant Professor, Mathematics. M.A., Technische Hochschule (Stuttgart), 1966, Ph.D., University of Minnasota, 1970.

Schmidt, Margaret N., Assistant Professor, Physical Education. B.S., University of North Carolina, 1957; M.A., University of Michigan, 1961; Ph.D., University of Maryland, 1972.

Schneider, Benjamin, Associate Professor, Psychology B.A., Alfred University, 1960, M.B.A., City University of New York (Baruch College), 1962, Ph.D., University of Maryland, 1967.

Schneider, David L., Associate Professor, Mathematics. A.B., Oberlin College, 1959, Ph.D., Massachusetts Institute of Technology, 1964

Schneier, Craig E., Lecturer, College of Business and Management B.S., Ohio State University, 1969, M.S., University of Colorado, 1972, D.B.A., 1975.

Schoettler, Carl A., Lecturer, Part-Time, College of Journalism. B.S., Temple University, 1959

Schoffstall, Allen M., Visiting Associate Professor, Part-Time, Chemistry B.S., Franklin and Marshall College, 1960; Ph.D., State University of New York (Albany), 1966.

Scholnick, Ellin K., Professor, Psychology. A.B., Vassar College, 1958, Ph.D., University of Rochester, 1963.

Schroeder, Wilburn C., Professor, Part-Time, Chemical Engineering. B.S., University of Michigan, 1930; M.S., 1931, Ph.D., 1933.

Schroll, Herman T., Instructor, Part-Time, English. B.A., Michigan State University, 1968, M.A., University of Maryland, 1971.

Schulman, Joseph R., Lecturer, Part-Time, Electrical Engineering B.E.E., City College of New York, 1944, M.S., University of Maryland, 1951.

Schultze, Charles L., Professor, Part-Time, Economics. B.A., Georgetown University, 1948, M.A., 1950, Ph.D., University of Maryland, 1960.

Schulz, Constance, Lecturer, Part-Time, History. B.A., College of Wooster, 1964, M.A., University of Cincinnati, 1966, Ph.D., 1973.

Schumacher, Elizabeth, Assistant Professor, Early Childhood Elementary Education. B.S., Newark State College, 1942; M.Ed., Pennsylvania State University, 1960, Ed.D., 1965.

Schumacher, Thomas A., Associate Professor, Music. B.Mus., Manhattan College, 1958, M.S., Juilliard School of Music, 1962

Schuster, Allan D., Lecturer, College of Business and Management B.S., Ohio State University, 1960, M.B.A., 1966

Schwartz, Robert, Lecturer, Part-Time, School of Architecture B.S., University of Cincinnati, 1965, M.C.P., Massachusetts Institute of Technology, 1968.

Scott, Leland E., Professor Emeritus, Horticulture B.S., University of Kentucky, 1927, M.S., Michigan State University, 1929, Ph.D., University of Maryland, 1943.

Seabreeze, Marjorie Da., Instructor, Part-Time, English. B.A., University of Maryland, 1970, M.A., 1972

Sedge, Kenneth R., Lecturer, Part-Time, Hearing and Speech Science B.S., Central Michigan University, 1963; M.A., Michigan State University, 1965, Ph.D., University of Washington, 1970

Sedovic, William M., Assistant Professor, Horticulture. B.S., University of Wisconsin, 1972; M.L.A., 1974

Seefeldt, Carol A., Associate Professor, Early Childhood Elementary Education. B.A., University of Wisconsin, 1956, M.A., University of South Florida, 1968, Ph.D., Florida State University, 1971

Seely, D. J., Instructor, Dairy Science and Manager, Dairy Manufacturing Laboratory. B.S., Virginia Polytechnic Institute, 1950.

Segal, David R., Professor, Sociology B.A., Harpur College, 1962, M.A., University of Chicago, 1963, Ph.D., 1967.

Segal, Mady W., Assistant Professor, Sociology B.A., City University of New York (Queens College), 1965, M.A., University of Chicago, 1967, Ph.D., 1973.

Segovia, Antonio V., Associate Professor, Geology B.S., Colorado School of Mines, 1956, Ph.D., Pennsylvania State University, 1963.

Seibel, Ronald J., Assistant Professor, Agricultural and Extension Education. B.S., University of Illinois (Urbana), 1957; M.S., 1958, Ph.D., University of Maryland, 1972.

Seidel, Kathryn L., Instructor, Part-Time, English B.A., Manhattanville College, 1970, M.A., University of Maryland, 1972.

Seidelmann, P. Kenneth, Visiting Assistant Professor, Physics and Astronomy E.E., University of Cincinnati, 1960; M.S., 1962, Ph.D., 1968

Seidler, Richard D., Assistant Professor, Music. B.S., Temple University, 1958, M.M., University of Texas, 1960, M.L.S., Catholic University of America, 1964, Ph.D., 1974

Seidman, Eric, Associate Professor, Special Education B.S., New York University, 1947, M.A., 1948, Ph.D., University of Connecticut, 1964

Seigel, Arnold E., Visiting Professor, Mechanical Engineering B.S., University of Maryland, 1944, M.S., Massachusetts Institute of Technology 1947, Ph.D., University of Amsterdam, 1952.

Selwyn, Cecile, Lecturer, Part-Time, Special Education. B.A., Queens College, 1970; M.Ed., American University, 1972.

Sengers, Jan V., Professor, Institute for Molecular Physics B.Sc., University of Amsterdam, 1952, Ph.D., 1962.

Senkevitch, Anatole, Jr., Assistant Professor, School of Architecture. B.S., University of Texas, 1967, M.Arch., University of Virginia, 1970, Ph.D., Cornell University, 1974

Serapaio, Luis B., Lecturer, Part-Time, Afro-American Studies. B.A., Seminario Maior de Lourenco-Marques (Mozambique), 1960 and 1964, M.A., Catholic University of America, 1971, Ph.D., American University, 1975.

Serota, Cornelia C., Instructor, Hearing and Speech Science. B.A., Smith College, 1943, M.A., University of Maryland, 1967

Serwer, Howard J., Associate Professor, Music. A.B., Yale University, 1949; Ph.D., 1969.

Sewell, Michael W., Lecturer, English. B.A., North Texas State College, 1958, M.A., Stanford University, 1966, Ph.D., University of Iowa, 1974.

Sewell, Winifred, Lecturer, Part-Time, College of Library and Information Services. B.A., State College of Washington, 1938, B.S. (L.S.), Columbia University, 1940.

Shaeffer, Ronald E., Associate Professor, School of Architecture. B.S., Rensselaer Polytechnic Institute, 1961; M.S., Iowa State University, 1963.

Shaffner, Clyne S., Professor, Poultry Science. B.S., Michigan State University, 1938, M.S., 1940; Ph.D., Purdue University, 1947.

Shafransky, Nessia, Instructor, Part-Time, Oriental and Hebrew Program. B.A., Tel-Aviv University (Israel), 1968.

Shanks, James B., Professor, Horticulture. B.S., Ohio State University, 1939, M.S., 1946, Ph.D., 1949.

Shapere, Dudley, Professor, Philosophy A.B., Harvard University, 1949, A.M., 1955, Ph.D., 1957

Shapiro, Jack J., Visiting Lecturer, Part-Time, Textiles and Consumer Economics B.A., University of Maryland, 1968, J.D., University of Maryland, 1970.

Shaw, Gilbert B., Lecturer, Part-Time, Chemistry B.A., Carleton College, 1965, Ph.D., University of Chicago, 1971.

Sheaks, Owen J., Associate Professor, Chemical Engineering B.S., North Carolina State University, 1964, Ph.D., 1969

Shearer, Jane K., Professor and Chairman, Housing and Applied Design B.S., University of Tennessee, 1940, M.S., 1950; Ph.D., Florida State University, 1960.

Sheen, Nellie M., Lecturer, Part-Time, Special Education B.S., University of Maryland, 1941, M.Ed., 1965.

Shelley, Shirley J., Associate Professor, Music and Early Childhood Elementary Education. B.M., University of Michigan, 1944, M.Mus., 1947

Shepherd, Julius C., Assistant Professor, Mathematics A.B., East Carolina College, 1944, M.A., 1947

Sheppard, Katherine, Assistant Professor, Dance. B.S., University of Virginia, 1964, M.A., George Washington University, 1971.

Sherak, Madeleine, Lecturer, Part-Time, Social Foundations of Education B.A., City College of New York, 1971, M.A., University of Maryland, 1974

Sherwood, Aaron W., Professor, Aerospace Engineering M.Eng., Rensselaer Polytechnic Institute, 1935, M.S., University of Maryland, 1943

Shiflett, John M., Assistant Professor, Institute for Child Study B.S., University of California (Santa Barbara), 1965, M.A., 1966; Ph.D., 1972.

Shoenberg, Robert E., Administrative Dean for Undergraduate Studies. B.A., Amherst College, 1957, M.A., University of Michigan, 1958, Ph.D., 1962

Shorb, Mary S., Research Professor Emerita, Poultry Science B.S., College of Idaho, 1928, Sc.D., Johns Hopkins University, 1933.

Shreeve, Charles A., Professor, Mechanical Engineering B.E., Johns Hopkins University, 1935, M.S., University of Maryland, 1943.

Shroyer, Charlotte A., Assistant Professor, Special Education. B.A., Ohio State University, 1961; M.Ed., University of Pittsburgh, 1972; Ph.D., 1975.

Sibley, Edgar H., Professor and Acting Chairman, Information Systems Management. B.Sc., University of London, 1946, S.M., Massachusetts Institute of Technology, 1962; Mech.Eng., 1966, Sc.D., 1967.

Sidwell, George M., Instructor, Institute of Applied Agriculture. B.S., Utah State University, 1940; M.S., Iowa State University, 1948; Ph.D., 1954

Siegrist, Henry G., Jr., Associate Professor and Acting Chairman, Geology B.A., Lehigh University, 1956, M.S., Pennsylvania State University, 1959, Ph.D., 1961.

Sieling, Fred W., Lecturer, Part-Time, Dairy Science. B.S., University of Maryland, 1932; M.S., 1938.

Sigall, H. F., Associate Professor, Psychology B.S., City University of New York (City College), 1964, Ph.D., University of Texas, 1968

Sigler, David P., Instructor, Physical Education. B.S., University of Maryland, 1962; M.A., 1968

Signell, Karl L., Assistant Professor, Music. B.S., Juilliard School of Music, 1962, M.A., Columbia University, 1963, Ph.D., University of Washington, 1973.

Silio, Charles B., Jr., Assistant Professor, Electrical Engineering. B.S.E.E., University of Notre Dame, 1965, M.S.E.E., 1967; Ph.D., 1970.

Silver, Sheila J., Instructor, College of Journalism. B.A., State University of New York (Albany), 1972, M.A., University of Maryland, 1975.

Silverman, Joseph, Professor, Chemical Engineering B.A., City University of New York (Brooklyn), 1944, A.M., Columbia University, 1948; Ph.D., 1951.

Simms, Betty H., Professor, Special Education. B.A., Harris Teachers College, 1947, M.A., University of Michigan, 1955; Ed.D., University of Maryland, 1962

Simons, David E., Associate Professor, Electrical Engineering. B.S., University of Maryland, 1949, M.S., 1951.

Simpson, R. Justin, Visiting Assistant Professor, Mathematics Sc.B., Brown University, 1962; M.S., Vanderbilt University, 1963; Ph.D., Johns Hopkins University, 1970.

Singer, Neil M., Associate Professor, Economics. A.B., Harvard University, 1960, M.A., Stanford University, 1961, Ph.D., 1965.

Sisler, Hugh D., Professor and Chairman, Botany B.S., University of Maryland, 1949, M.S., 1951; Ph.D., 1953.

Skelton, Earl F., Lecturer, Part-Time, Mechanical Engineering B.S., Fairleigh Dickinson University, 1962; Ph.D., Rennselaer Polytechnic Institute, 1967

Skiadaressis, George A., Visiting Professor, School of Architecture. M.S., Technicel University of Munich (Germeny), 1941; M.C.P., Massechusetts Institute of Technology, 1952; M.Arch., 1953

Skolnick, Leonard P., Professor, Part-Time, Chemicel Engineering. B.S., University of Rochester, 1953; A.B., 1953, M.S., New York University, 1955; D.Sc., Massachusetts Institute of Technology, 1958.

Slawsky, Milton M., Lecturer, Part-Time, Physics and Astronomy. B.S., Rensselaer Polytechnic Institute, 1933, M.S., California Institute of Technology, 1935, Ph.D., University of Michigan, 1938

Slawsky, Zaka I., Professor, Part-Time, Physics and Astronomy. B.S., Renssalaer Polytechnic Institute, 1933; M.S., California Institute of Technology, 1935, Ph.D., University Michigen, 1938.

Sloan, Barbara, Instructor, Dance. B.S., University of Utah, 1974

Small, Eugene B., Associate Professor, Zoology. B.A., Wayne State University, 1953; M.S., 1958; Ph.D., University of California (Los Angeles), 1964.

Smit, Ann B., Instructor, Hearing and Speech Sciences. A.B., Calvin College, 1966; M.A., University of Iowa, 1969

Smith, A. Robert, Lecturer, Part-Time, College of Journalism. B.S., Juniata College, 1950.

Smith, Barbara, Instructor, Food, Nutrition and Institution Administration. B.S., Hampton Institute, 1969; M.S., Michigan State University, 1971.

Smith, Barry D., Associate Professor, Psychology. B.S., Pennsylvania State University, 1962; M.A., Bucknell University, 1964; Ph.D., University of Massachusetts, 1967.

Smith, Betty F., Professor and Chairman, Textiles and Consumer Economics. B.S., University of Arkansas, 1951; M.S., University of Tennessee, 1956; Ph.D., University of Minnesota, 1965.

Smith, Elbert B., Professor, History. A.B., Maryville College, 1940; A.M., University of Chicago, 1947; Ph.D., 1949.

Smith, Elske V., Professor, Physics and Astronomy; Assistant Provost, Division of Mathematical and Physical Sciences and Engineering. A.B., Radcliffe College, 1950; A.M., 1951; Ph.D., 1955.

Smith, Gary L., Instructor, Agricultural Engineering. B.A., Pennsylvania State University, 1973; M.S., 1975.

Smith, Gayle S., Associate Professor, English. B.S., Iowa State University, 1948; M.A., Cornell University, 1952; Ph.D., 1958.

Smith, Harold D., Professor, Agricultural and Resource Economics, Acting Director, Cooperative Extension Service. B.A., Bridgewater College, 1943; M.S., University of Maryland, 1947; Ph.D., American University, 1952

Smith, Harold F., Lecturer, Part-Time, Mechanical Engineering. B.S., Ohio State University, 1948; M.S., 1949.

Smith, Harper J., Instructor, Part-Time, Industrial Education. B.S., University of Oklahoma, 1950.

Smith, Hilda L., Assistant Professor, History. B.S., Southwest Missouri State University, 1963; M.A., University of Missouri, 1964; Ph.D., University of Chicago, 1975

Smith, Pamela Z., Assistant Professor, Computer Science. B.A., Cornell University, 1970; M.S., University of Wisconsin, 1972; Ph.D., 1975.

Smith, Paul J., Assistant Professor, Mathematics. B.S., Drexel Institute of Technology, 1965; M.S., Case-Western Reserve University, 1967; Ph.D., 1969

Smith, Theodore G., Professor, Chemical Engineering. B.S.E., Johns Hopkins University, 1956; M.S., 1958; D.Sc., Washington University (Missouri), 1960.

Smock, Raymond W., Instructor, History. B.A., Roosevelt University, 1966; Ph.D., University of Maryland, 1974

Smyley, Karen M., Lecturer, Part-Time, Afro-American Studies. B.A., Hunter College, 1965; M.A., Middleburg College, 1968.

Snapp, Audrey N., Associate Professor, Music. B.Mus., Westminster Choir College, 1947; M.A., University of Hawaii, 1971.

Snow, George A., Professor, Physics and Astronomy. B.S., City University of New York (City College), 1945; M.A., Princeton University, 1947; Ph.D., 1949

Snower, Dennis J., Assistant Professor, Economics. B.A., Oxford University, 1971; M.A., 1973; M.A., Princeton University, 1973; Ph.D., 1975.

Snyder, Donald C., Instructor, Part-Time, Economics. B.A., Alme College, 1966; M.A., Miami University (Ohio), 1968.

Soares, Joseph H., Jr., Associate Professor, Poultry Science. B.S., University of Meryland, 1964; M.S., 1966; Ph.D., 1968.

Soergel, Dagobert, Associate Professor, College of Library and Information Services. B.S., University of Freiburg, 1960; M.S., 1964; Ph.D., 1967

Soergel, Kenneth P., Associate Professor, Horticulture. B.S., Pennsylvenia State University, 1961; M.L.A., Harvard University, 1963.

Sollazzo, Gary J., Instructor, Part-Time, Philosophy. B.A., Creighton University, 1964; M.A., University of Iowa, 1967; Ph.D., University of Meryland, 1973.

Solomon, Susan L., Assistant Professor, College of Business and Management. A.B., Radcliffe College, 1962; M.S., University of California (Los Angeles), 1966; Ph.D., University of California (Berkeley), 1972.

Solomos, Theophanes, Assistant Professor, Horticulture. B.S., Athens College of Agriculture (Greece), 1956; M.S., 1957; Ph.D., Cambridge University (England), 1963

Sommer, Michael H., Associate Professor, College of Journalism. A.B., University of California (Berkeley), 1957; M.S., University of California (Los Angeles), 1958; Ph.D., University of Southern California, 1969

Sommer, Sheldon E., Associate Professor, Geology. B.S., City University of New York (City College), 1959; M.A., 1961; M.S., Texas Agricultural and Mechanical University, 1964; Ph.D., Pennsylvania University, 1950

Soong, Su-Tzai, Visiting Assistent Professor, Meteorology B.S., National Taiwan University, 1966; M.S., University of Missouri, 1969; Ph.D., 1971.

Sorensen, Shirley C., Instructor, Mathematics. B.S., Wilson College, 1945; M.A., University of Maryland, 1965; Ph.D., 1975.

Sorokin, Constantine A., Research Professor Emerita, Botany A.B., Don Institute, 1927; M.A., Acedemy of Sciences (Moscow), 1936; Ph.D., University of Texas, 1955.

Sorter, Bruce W., Assistant Professor, Agricultural and Extension Education. B.A., University of Maryland, 1967; M.C.P., Howard University, 1969; Ph.D., University of Maryland, 1972.

Sorum, Judith A., Assistant Dean for Undergraduate Studies. B.A., Michigan State University, 1967; M.A., 1969; Ph.D., 1973.

Sosnowski, Saul, Associate Professor, Spanish and Portuguese. B.A., University of Scranton, 1967; M.A., University of Virginia, 1968; Ph.D., 1970.

Spain, Ian L., Professor, Chemical Engineering. B.S. Hons., Imperial College of Science (London), 1961; Ph.D., 1964

Spalding, Carol A., Instructor, Zoology. B.S., Gordon College, 1964; M.S., University of Maryland, 1970.

Spangler, Paul J., Lecturer, Entomology. B.A., Lebanon Valley College, 1949; M.S., Ohio University, 1951; Ph.D., University of Missouri, 1960.

Sparks, David S., Professor, History; Administrative Dean for Graduate Studies. B.A., Grinnell College, 1944; M.A., University of Chicago, 1945; Ph.D., 1951.

Spates, Michael F., Lecturer, Part-Time, College of Business and Management. B.S., University of Maryland, 1970; M.B.A., 1972.

Specter, Gerald, Assistant Professor, Psychology. B.A., Harvard University, 1966; Ph.D., University of Rochester, 1971.

Spiegel, Gabrielle M., Assistant Professor, History. B.A., Bryn Mawr College, 1964; M.A.T., Harvard University, 1965; M.A., Johns Hopkins University, 1969; Ph.D., 1974

Spiro, Marie, Assistant Professor, Art. B.A., Wilson College, 1957; M.A., New York University, 1961.

Spivak, Stephen M., Associate Professor, Textiles and Consumer Economics. B.S., Philadelphia College of Textiles and Science, 1963; M.S., Georgia Institute of Technology 1965; Ph.D., University of Manchester, 1967.

Spivey, C. Clinton, Associate Professor, College of Business and Management. B.S., University of Illinois (Urbana), 1946; M.S., 1947; Ph.D., 1957

Splaine, John E., Assistant Professor, Administration, Supervision and Curriculum. B.A., University of New Hampshire, 1963; M.A., 1965; Ed.D., Boston University, 1972.

Springmann, Fague K., Associate Professor, Music. B.Mus., Westminster Choir College, 1939.

Stadtman, Earl R., Lecturer, Part-Time, Microbiology. B.S., University of California (Berkeley), 1942; Ph.D., 1949

Stagliano, Anthony J., Lecturer, College of Business and Management. B.S., University of Pennsylvania, 1967; M.B.A., University of Michigan, 1968

Staley, Stuart W., Professor, Chemistry. B.A., Williams College, 1959; M.S., Yale University, 1961; Ph.D., 1964

Stant, Margaret A., Assistant Professor Emerita, Early Childhood Elementary Education. B.S., University of Meryland 1952; M.Ed., 1955.

Starcher, E. Thomas, Assistant Professor, Speech and Dramatic Art. B.A., University of Southern California, 1940; M.S., University of Kansas, 1948.

Stark, Francis C., Jr., Professor, Horticulture; Provost, Division of Agricultural and Life Sciences. B.S., Oklahoma State University, 1940; M.S., University of Maryland, 1941; Ph.D., 1948

Starkweather, Kendall N., Assistent Professor, Industrial Education. B.S., Western Illinois University, 1967; M.A., Eastern Michigen University, 1969; Ph.D., University of Maryland, 1975.

Statom, Jodellano J., Assistant Professor, Administration, Supervision and Curriculum. B.S., District of Columbia Teachers College, 1954; M.Ed., University of Maryland, 1968; Ed.D., 1972

Steel, Donald H., Professor, Physical Education. B.S., Trenton State College, 1955; M.A., University of Meryland, 1957; Ph.D., Louisiana State University, 1964

Steele, Robert E., Assistant Professor, Psychology. B.A., Morehouse College, 1965; M.Div., Episcopel Theological School, 1968; M.P.H., Yale University, 1971; M.S., 1974; Ph.D., 1975.

Steely, Lewis R., Instructor, Mathematics. B.S., District of Columbia Teachers College, 1937; B.A., Catholic University of America, 1945.

Steinberg, Phillip H., Professor, Physics and Astronomy. B.S., University of Cincinnati, 1954; Ph.D., Northwestern University, 1959.

Steinberg, Richard I., Assistant Professor, Physics and Astronomy. B.A., Swarthmore College, 1963; Ph.D., Yale University, 1969.

Steinhauer, Allen L., Professor and Acting Chairman, Entomology. B.S.A., University of Manitoba, 1953; M.S., Oregon State University, 1955; Ph.D., 1958.

Steinman, Robert M., Professor, Psychology. D.D.S., Saint Louis University, 1948; M.A., New School For Social Research, 1962; Ph.D., 1964

Stellmacher, Karl L., Professor, Mathematics. M.D., University Goettingen, 1933; Ph.D., 1936.

Stenstrom, Joe Ann, Instructor, Part-Time, Secondery Education. B.A., Seattle Pacific College, 1956; M.Ed., University of Weshington, 1965; M.L.S., University of Maryland, 1968.

Stephens, E. Robert, Professor and Chairmen, Administration, Supervision and Curriculum. B.S., Morningside College, 1952; M.S., Drake University, 1958; Ph.D., State University of Iowa, 1966.

Stern, Herbert J., Associate Professor, Counseling and Personnel Services. B.S., Johns Hopkins University, 1950; M.Ed., 1953; Ed.D., University of Maryland, 1962.

Stern, Lawrence, Assistant Professor, Philosophy. B.A., Rutgers University, 1958; M.A., Harvard University, 1962; Ph.D., 1968

Stern, William L., Professor, Botany. B.S., Rutgers University, 1950; M.S., University of Illinois (Urbana), 1951; Ph.D., 1954

Sternberg, Yaron M., Professor, Civil Engineering. B.S., University of Illinois (Urbana), 1961; M.S., University of California (Berkeley), 1963; Ph.D., 1965.

Sternheim, Charles E., Associate Professor, Psychology. B.A., City University of New York (Brooklyn College), 1961; Ph.D., University of Rochester, 1967

Stevens, George A., Professor, Agricultural and Resource Economics. B.S., Virginia Polytechnic Institute, 1941; Ph.D., University of Maryland, 1957.

Stevens, J. G., Jr., Instructor, Fire Service Extension.

Stevenson, Barbara H., Instructor, English. B.A., University of California (Los Angeles), 1938; M.A., University of California (Berkeley), 1939

Stevenson, John C., Assistent Professor, Botany. B.S., City University of New York (Brooklyn), 1966; Ph.D., University of North Caroline, 1972.

Stevenson, Richard C., Instructor, Part-Time, Recreation. B.S., University of Meryland, 1964; M.S., Michigan State University, 1973

Stewart, Gilbert W., Associate Professor, Computer Science and Institute for Fluid Dynemics and Applied Mathematics. A.B., University of Tennessee, 1962; Ph.D., 1968

Stewart, James M., Professor, Chemistry. B.A., Western Washington State College, 1953; Ph.D., University of Washington, 1958

Stewart, Kent K., Lecturer, Food, Nutrition, and Institution Administretion. B.S., University of California, 1956; Ph.D., Florida State University, 1965

Stewart, Larry E., Associate Professor, Agricultural Engineering. B.S.A.E., West Virginia University, 1960; M.S., 1961; Ph.D., University of Maryland, 1972

Stewart, William R., Jr., Lecturer, College of Business and Management. B.S., Tufts University, 1966; M.S., Johns Hopkins University, 1972.

Stifel, Peter B., Associate Professor, Geology. B.S., Cornell University, 1958; Ph.D., University of Utah, 1964

Stiles, Herbert D., Assistant Professor, Horticulture. B.S., Rutgers University, 1965; M.S., 1967; Ph.D., University of Florida, 1974

Stites, M. Elizabeth, Associate Professor, Art. B.Arch., New York University, 1940

Stone, Clarence N., Associate Professor, Government and Politics, Maryland Technical Advisory Service. A.B., University of South Carolina, 1957; M.A., University of North Carolina, 1960; Ph.D., 1963

Stone, Stephen E., Assistant Professor, Health Education. B.S., Lock Haven State College, 1962; M.Ed., East Stroudsburg State College, 1969; Ph.D., Texas Agricultural and Mechanical University, 1973

Stough, Kenneth F., Associate Professor, Industrial Education. B.S., Millersville State College, 1954; M.Ed., Pennsylvania State University, 1961; Ed.D., University of Maryland, 1969

Stowasser, Karl, Associate Professor, History. Ph.D., University of Muenster, 1966

Stowers, Bernard D., Instructor, Part-Time, Afro-American Studies. B.A., San Francisco State University, 1971

Straszheim, Mahlon R., Professor, Economics. B.S., Purdue University, 1961; Ph.D., Harvard University, 1965

Strausbaugh, Warren L., Professor Emeritus, Speech and Dramatic Art. B.S., Wooster College, 1932; M.A., State University of Iowa, 1935

Strauss, Aaron S., Professor, Mathematics. B.S., Case-Western Reserve University, 1961; M.S., University of Wisconsin, 1962; Ph.D., 1964

Straw, Rebecca J., Instructor, Part-Time, Secondary Education. B.S., Ohio University, 1970; M.Ed., University of Maryland, 1974

Street, Orman E., Professor Emeritus, Agronomy. B.S., South Dakota State College, 1924; M.S., Michigan State College, 1927; Ph.D., 1933

Street, Theodore P., Lecturer, Institute of Applied Agriculture. B.S., University of Maryland, 1973

Strickling, Edward, Professor, Agronomy. B.S., Ohio State University, 1937; Ph.D., 1949

Striffler, Charles D., Assistant Professor, Electrical Engineering. B.S.E., University of Michigan, 1961; M.S.E., 1963; Ph.D., 1972

Strobell, Ada P., Associate Professor, Recreation. B.A., San Francisco State College, 1953; M.S., University of California (Los Angeles), 1958; Ph.D., University of Illinois (Urbana), 1966

Strouse, James C., Assistant Professor, Government and Politics. B.A., University of Maryland, 1966; M.A., 1967; Ph.D., University of North Carolina, 1970

Stuart, William T., Assistant Professor, Anthropology. B.A., George Washington University, 1961; Ph.D., University of Oregon, 1971

Stunkard, Clayton L., Professor, Measurement and Statistics. B.A., University of Minnesota, 1948; M.A., 1951; Ph.D., 1959

Stuntz, Calvin F., Professor, Chemistry. B.S., State University of New York (Buffalo), 1939; Ph.D., 1947

Stuntz, Shirley M., Instructor, Chemistry. B.S., George Washington University, 1946; M.S., University of Delaware, 1948

Sturgis, Charles J., Lecturer, Part-Time, Music. B.Mus., Cleveland Institute of Music, 1950

Sublett, Henry L., Professor and Chairman, Early Childhood Elementary Education. A.B., Duke University, 1951; M.Ed., University of Virginia, 1953; Ed.D., 1959

Sucher, Joseph, Professor, Physics and Astronomy. B.S., City University of New York (Brooklyn College), 1952; Ph.D., Columbia University, 1957

Suckling, Norman C., Visiting Professor, French and Italian. B.A., Oxford University (England), 1925; M.A., 1929; B.A., University of London (England), 1936

Sullivan, Dorothy D., Associate Professor, Early Childhood Elementary Education. A.B., University of Maryland, 1945; M.Ed., 1960; Ed.D., 1965

Sunal, Dennis W., Assistant Professor, Early Childhood Elementary Education. B.S., University of Michigan, 1964; M.A., 1970; Ph.D., 1973

Suppe, F. R., Associate Professor, Philosophy. A.B., University of California (Riverside), 1962; M.A., University of Michigan, 1964; Ph.D., 1967

Surra, Catherine A., Instructor, Family and Community Development. B.S., Pennsylvania State University, 1972; M.S., University of Maryland, 1974

Suter, Charles M., Assistant Professor, Part-Time, Hearing and Speech Sciences. B.S.E.E., Drexel University, 1964; Ph.D., University of Maryland, 1969

Sutherland, Phyllis B., Assistant Professor, Music. B.Mus., Syracuse University, 1967; M.Mus., 1969

Svenonius, D. B., Instructor, Part-Time, Philosophy. B.A., Wellesley College, 1961; M.A., University of Chicago, 1964

Svenonius, Lars S., Professor, Philosophy. Fil. Kand., Uppsala University (Sweden), 1950; Fil. Mag., 1955; Fil. Lic., 1955; Fil. Dr., 1960

Svirbeley, William J., Professor Emeritus, Chemistry. B.S., Carnegie Institute of Technology, 1931; M.S., 1932; D.Sc., 1935

Svoboda, Cyril P., Assistant Professor, Institute for Child Study. B.A., Saint Columban's Seminary, 1954; B.Th., 1958; B.Ph., Georgian University (Rome), 1959; L.Ph., 1960; Ph.D., 1961; Ph.D., University of Wisconsin (Madison), 1973

Sweet, Daniel, Associate Professor, Mathematics. B.S., Fairleigh Dickinson University, 1965; Ph.D., Brown University, 1969

Syski, Ryszard, Professor, Methematics. B.S., University of London, 1954; Ph.D., Chelsea College, 1960

Taff, Charles A., Professor, College of Business and Management. B.S.C., State University of Iowa, 1937; M.A., 1941; Ph.D., University of Maryland, 1952

Talaat, Mostafa E., Professor, Mechanical Engineering. B.Sc., University of Cairo, 1946; M.S., University of Pennsylvania, 1947; Ph.D., 1951

Tallman, Greg Z., Assistant Professor, Music. B.Mus., New England Conservetory of Music, 1970; M.Mus., Arizona State University, 1975

Tanner, John L., Lecturer, Part-Time, Institute of Applied Agriculture

Tanney, Mary Faith, Assistant Professor, Psychology. B.A., Pennsylvania State University, 1968; M.A., Ohio State University, 1971; Ph.D., 1972

Tarica, Ralph, Associate Professor and Acting Chairman, French and Italian. B.A., Emory University, 1954; M.A., 1958; Ph.D., Harvard University, 1966

Taylor, Corwin H., Professor, Music and Secondary Education. B.Mus., College of Music of Cincinnati, 1930; B.S., University of Cincinnati, 1932; M.Mus., 1933; M.Ed., 1935; Ed.D., 1941

Taylor, Dalmas A., Professor, Psychology. B.A., Western Reserve University, 1959; M.S., Howard University, 1961; Ph.D., University of Delaware, 1965

Taylor, Leonard S., Professor, Electrical Engineering. A.B., Harverd University, 1951; M.S., New Mexico State University, 1956; Ph.D., 1960

Taylor, Martin E., Assistant Professor, College of Business and Management. B.Comm., University of Capetown, 1966; M.B.A., University of Texas, 1970; Ph.D., 1974

Taylor, Ronald C., Visiting Assistant Professor, Meteorology. B.A., University of California (Los Angeles), 1960; Ph.D., University of Hawaii, 1969

Tennant, C. S., Instructor, Agriculture and Extension Education. B.S., University of Florida, 1962; M.S., George Washington University, 1971

Tennyson, R. A., Associate Professor, Institute of Criminal Justice and Criminology. B.S., Washington State University, 1951; M.A., 1957; Ph.D., 1965

Terchek, Ronald J., Associate Professor, Government and Politics. B.A., University of Chicago, 1958; M.A., 1960; Ph.D., University of Maryland, 1965

Tesi, Georgio, Visiting Lecturer, Chemistry. M.A., Massachusetts Institute of Technology, 1966; Ph.D., University of Florence (Italy), 1952

Testa, Charles J., Assistant Professor, Information Systems Management. B.S., Lafayette College, 1964; M.S., University of California (Los Angeles), 1966; Ph.D., 1969

Thieblot, Armand J., Jr., Associate Professor, College of Business and Management. B.S.E., Princeton University, 1961; M.B.A., University of Pennsylvania, 1965; Ph.D., 1969.

Thomas, Frederick H., Lecturer, Part-Time, Architecture. B.Arch., Howard University, 1958

Thomas, Owen P., Associate Professor and Chairman, Poultry Science. B.S., University of Natal, 1954; M.S., 1962; Ph.D., University of Maryland, 1966

Thomas, Susan M., Lecturer, College of Business and Management. B.A., Elmira College, 1971; M.B.A., University of Maryland, 1973

Thomas, William L., Assistant Professor, Counseling and Personnel Services, Vice Chancellor for Student Affairs. B.S., University of Tennessee, 1955; M.S., 1965; Ph.D., Michigan State University, 1970

Thompson, Arthur H., Professor, Horticulture. B.S., University of Minnesota, 1941; Ph.D., University of Maryland, 1945

Thompson, Derek, Associate Professor, Geography. B.A., Manchester University, 1960; M.A., 1962; Ph.D., Indiana University, 1969

Thompson, Fred R., Professor Emeritus, Institute for Child Study. B.A., University of Texas (Austin), 1925; M.A., 1935; Ed.D., University of Maryland, 1952

Thompson, Harvey W., Assistant Professor, Speech and Dramatic Art. B.S., Wayne State University, 1966; M.F.A., Columbia University, 1972

Thompson, James C., Jr., Assistant Professor, Recreation. B.A., Mississippi State University, 1967; M.S., Colorado State University, 1970; Ph.D., 1974

Thompson, Owen E., Associate Professor, Meteorology. B.S., University of Missouri, 1961; M.S., 1963; Ph.D., 1968.

Therberg, Raymond, Associate Professor, English. B.A., University of Alaska, 1939; M.A., University of Chicago, 1948; Ph.D., Cornell University, 1954

Thorn, Colin E., Assistant Professor, Geography. B.A., University of Nottingham (England), 1967; M.Sc., McGill University, 1970; Ph.D., University of Colorado, 1974

Tidman, Derek A., Research Professor, Institute for Fluid Dynamics and Applied Mathematics. B.Sc., London University, 1952; Ph.D., 1956.

Tierney, William F., Associate Professor, Industrial Education. B.S., Central Connecticut State College, 1941; M.S., Ohio University, 1949; Ed.D., University of Maryland, 1952

Tifft, Margaret A., Associate Professor, Health Education. B.S., Ohio State University,, 1946; M.A., Columbia University, 1948; Ed.D., West Virginia University, 1969

Tilford, Shelby G., Visiting Professor, Part-Time, Institute for Molecular Physics. B.S., Western Kentucky University, 1958; Ph.D., Vanderbilt University, 1962.

Todd, S. Herman, Instructor, Horticulture. B.S., Ohio State University, 1937.

Terrer, Stephen E., Lecturer, Part-Time, Counseling and Personnel Services. B.A., Gettysburg College, 1969; M.A., University of Maryland, 1970; Ph.D., 1972.

Tossell, J. A., Assistant Professor, Chemistry. B.S., University of Chicago, 1966; M.A., Harvard University, 1967; Ph.D., 1972.

Townsend, Betty W., Instructor, English; Assistant to the Provost, Division of Arts and Humanities. B.A., University of North Carolina, 1944; M.A., University of Maryland, 1961.

Traver, Paul P., Professor, Music. B.Mus., Catholic University of America, 1955; M.Mus., 1957; D.M.A., Stanford University, 1967.

Travis, Irene L., Lecturer, College of Library and Information Services. B.A., Mills College, 1962; M.L.S., University of California (Berkeley), 1966

Tretter, Steven A., Associate Professor, Electrical Engineering. B.S., University of Maryland, 1962; M.A., Princeton University, 1964; Ph.D., 1966

Trimble, Virginia L., Visiting Associate Professor, Physics and Astronomy. B.A., University of California (Los Angeles), 1964; M.S., California Institute of Technology, 1965; Ph.D., 1968; M.A., Cambridge University, 1969

Trivelpiece, Alvin W., Professor, Physics and Astronomy. B.S., California State Polytechnic College, 1953; M.S., California Institute of Technology, 1955; Ph.D., 1958.

Troth, Eugene W., Professor and Chairman, Music. B.M., Depaul University, 1947; M.M., 1950; Ph.D., University of Michigan, 1958.

Trousdale, Marion S., Assistant Professor, English. B.A., University of Michigan, 1951; M.A., University of California (Berkeley), 1955; Ph.D., University of London (England), 1975.

Truitt, Candace S., Instructor and Assistant to the Dean, College of Journalism. B.S., University of Maryland, 1972.

Tsien, Yi, Lecturer, Part-Time, Economics. B.A., National Taiwan University, 1951; M.A., University of North Carolina, 1957.

Tsui, Chung Y., Assistant Professor, Mechanical Engineering. B.S., University of Hong Kong, 1953; M.S., Purdue University, 1959; Ph.D., 1967.

Tulloss, Thomas C., Instructor, Part-Time, English. B.A., Yale University, 1968; M.A., University of Maryland, 1970.

Tuthill, Dean F., Professor, Agricultural and Resource Economics. B.S., Cornell University, 1949; M.S., University of Illinois (Urbana), 1954; Ph.D., 1958.

Twigg, Bernard A., Professor and Chairman, Horticulture. B.S., University of Maryland, 1952; M.S., 1955; Ph.D., 1959.

Tyler, Bonnie B., Assistant Professor, Institute for Child Study. B.A., Depauw University, 1948; M.A., Ohio State University, 1949; Ph.D., 1954.

Tyler, Forrest B., Professor, Psychology. B.A., Depauw University, 1948; M.A., Ohio State University, 1950; Ph.D., 1952.

Tyler, Robert W., Assistant Professor, Physical Education. A.B., Drury College, 1957; M.S., Pennsylvania State University, 1960; Ph.D., 1969.

Tyler, Suzanne J., Instructor, Physicel Education. B.S., Northeastern University (Boston-Bouve College), 1969; M.S., Pennsylvania State University, 1973

Ulmer, Melville J., Professor, Economics. B.S., New York University, 1937, M.A., 1938, Ph.D., Columbia University, 1948

Ulrich, Homer, Professor Emeritus, Music. M.A., University of Chicago, 1939.

Undersander, Daniel J., Assistent Professor, Agronomy. B.S., University of Minnesota, 1972, M.S., Purdue University 1974, Ph.D., 1975.

Underwood, William E., Instructor, Part-Time, Computer Science. B.B., University of Kansas, 1967, M.S., University of Maryland, 1972

Uslaner, Eric M., Assistent Professor, Government and Politics. B.A., Brandeis University, 1968, M.A., Indiana University, 1970; Ph.D., 1973

Vaca, Marco V., Visiting Assistant Professor, Electrical Engineering. E.E., Escuela Politecnica Nacional (Ecuador), 1969, M.S.E.E., University of Wisconsin (Madison), 1969, D.Sc., Washington University (Saint Louis), 1975.

Vaccaro, Paul, Lecturer, Secondary Educetion and Physical Education. B.S., University of Massachusetts, 1970, M.A., University of Florida, 1973.

Vaglia, John S., Instructor, Industrial Educetion. B.S., California State College (Pennsylvania), 1964, M.A., East Tennessee State University, 1970.

Van Egmond, Peter G., Assistant Professor, English. B.A., Mississippi College, 1959, M.A., University of Mississippi, 1961, Ph.D., University of North Caroline, 1966.

Van Valkenburg, Shirley D., Assistent Professor, Botany and Natural Resources Institute. B.A., Washington State University, 1948; M.S., University of Washington, 1968, Ph.D., 1970.

Van Zwoll, James A., Professor Emeritus, Aominstration, Supervision and Curriculum. B.A., Calvin College, 1933; M.A., University of Michigan, 1937; Ph.D., 1942.

Vanderbrug, Gordon J., Instructor, Computer Science. B.A., Calvin College, 1964, M.A., Wayne State University, 1966.

Vandergoot, David, Lecturer, Counseling and Personnel Services. A.B., Calvin College, 1969, M.A., Michigan State University, 1972

Vandergraft, James S., Associate Professor, Computer Science. B.S., Stanford University, 1959, M.S., 1963; Ph.D., University of Maryland, 1966.

Vandersall, John H., Professor, Dairy Science. B.S., Ohio State University, 1950; M.S., 1954, Ph.D., 1959

Vanderslice, Betty R., Instructor, Part-Time, Mathematics. B.A., Upsala College, 1945; M.A., University of Maryland, 1948.

Vanderslice, Joseph T., Professor and Chairman, Chemistry B.S., Boston College, 1949, Ph.D., Massachusetts Institute of Technology, 1952.

Vandervelden, Lee R., Assistant Professor, Physical Education. B.S., University of Wisconsin, 1961; Ph.D., 1971.

Vann, R. Lindley, Assistant Professor, School of Architecture. B.A., University of Texas, 1967, Ph.D., Cornell University, 1975.

Vannoy, Donald W., Assistant Professor, Civil Engineering. B.S.C.E., West Virginia Institute of Technology, 1970; M.E., University of Virginia, 1971; Ph.D., 1975.

Vaughan, Charles H., III, Associate Professor, Speech and Dramatic Art. B.S., Edinboro State College (Pennsylvania), 1961, M.A., University of Denver 1964

Vavrichek, Bruce C., Lecturer, Economics. B.S., Michigan State University, 1971, M.A., Northwestern University, 1972.

Veitch, Fletcher P., Professor Emeritus, Chemistry. B.S., University of Maryland, 1931, M.S., 1933, Ph.D., 1935.

Vellucci, Matthew J., Lecturer, Part-Time, College of Library and Information Services. B.A., Saint Pius X Seminary, 1958, M.S., Columbia University, 1962.

Verchot, John H., Lecturer, Part-Time, Institute of Criminal Justice and Criminology. B.A., University of Maryland, 1959; J.D., Catholic University of America, 1962, M.A., University of Maryland, 1964

Vermeij, Geerat J., Associate Professor, Zoology. A.B., Princeton University, 1968, M.Phil., Yale University, 1970, Ph.D., 1971

Vernekar, Anandu D., Associate Professor, Meteorology. B.Sc., University of Michigan, 1958, M.Sc., 1959, M.S., 1963, Ph.D., 1966.

Vesentini, Edoardo, Professor, Mathematics. Laurea in Scienze Mathematics, Universita di Melano, 1950, Libere Docenza in Geometra, Universita de Roma, 1956

Via, James E., Associate Professor, Agricultural and Resource Economics. B.S., North Caroline State University, 1952, M.S., 1964, Ph.D., 1967

Viano, Emilio C., Visiting Associate Professor, Part-Time, Institute of Criminal Justice and Criminology. Ph.D., Alfonsianum (Rome), 1965, M.A., University of Notre Deme, 1967, Ph.D., New York University, 1973.

Vignone, Barbera M., Instructor, Secondery Education. B.S., University of Connecticut, 1961, M.Ed., University of Meryland, 1970.

Vijay, Inder K., Assistent Professor, Dairy Science. B.S., Punjab University (India), 1961, M.S., University of Saskatchewan, 1966, Ph.D., University of California (Davis), 1971.

Viola, Victor E., Jr., Professor, Chemistry. A.B., University of Kansas, 1957, Ph.D., University of California (Berkeley), 1961

Vitzthum, Richard C., Associate Professor, English. B.A., Amherst College, 1957, M.A., Harvard University, 1958; Ph.D., Stanford University, 1963.

Vlach, John M., Assistant Professor, English. A.B., University of California (Davis), 1970, M.A., Indiana University, 1972; Ph.D., 1975

Voll, Mary Jane, Assistant Professor, Microbiology. B.A., Mount Saint Agnes College, 1955; M.S., Johns Hopkins University, 1961; Ph.D., University of Pennsylvania, 1964

Vroman, Wayne G., Assistent Professor, Economics. B.A., University of Michigan, 1962, Ph.D., 1967.

Wabeck, Charles J., Associate Professor, Poultry Science. B.S., University of Massachusetts, 1962; M.S., University of New Hampshire, 1964, Ed.D., Purdue University, 1966.

Wachhaus, Gustav E., Assistant Professor, Music. B.S., West Chester State College, 1957; M.A., Columbia University 1966, Ed.D., 1973.

Waddel, Fred E., Lecturer, Part-Time, Family and Community Development. B.A., University of Kentucky, 1961, M.S., Kansas State University, 1965.

Wagner, Susan F., Instructor, Mathematics. B.A., City University of New York (Brooklyn College), 1959; M.A., 1967

Wagner, Thomas C. G., Professor, Electrical Engineering. B.S., Harvard University, 1937; M.A., University of Maryland, 1939; Ph.D., 1941.

Wakefield, John E., Associate Professor, Music. B.Mus., University of Michigan, 1963, M.Mus., 1964

Waldner, Ilmar, Assistant Professor, Philosophy. B.S., University of Illinois, 1961, Ph.D., Stanford University, 1969.

Waldrop Robert S., Professor, Psychology. B.A., University of Oklahoma, 1934; B.D., McCormick Theological Seminary, 1937; Ph.D., University of Michigan, 1948.

Walker, David B., Lecturer, Part-Time, Government and Politics and Institute of Urban Studies. B.A., Boston University, 1949, M.A., 1950; Ph.D., Brown University, 1956

Wall, Nathan S., Professor, Physics and Astronomy. B.S., Rensselaer Polytechnic Institute, 1949, Ph.D., Massachusetts Institute of Technology, 1954

Wallace, James, Assistant Professor, Mechanical Engineering. B.C.E., Georgia Institute of Technology, 1962, M.Sc., 1964, D.Phil., Oxford University, 1969.

Wallace, Stephen J., Assistant Professor, Physics and Astronomy. B.S., Case Institute of Technology, 1961, M.S., University of Washington, 1969, Ph.D., 1971.

Walston, William H., Jr., Associate Professor, Mechanical Engineering. B.M.E., University of Delawere, 1959, M.S., 1961, Ph.D., 1964

Walt, James, Associate Professor, English. B.A., University of Minnesota, 1936, M.A., University of Michigan, 1937; Ph.D., 1955.

Walters, William B., Associate Professor, Chemistry. B.S., Kansas State University, 1960, Ph.D., University of Illinois (Urbana), 1964

Wang, D. K., Instructor, Oriental and Hebrew Program. B.A., University of Meryland, 1971, M.S., Georgetown University, 1972.

Ward, Charles D., Associate Professor, Psychology. B.A., Pomone College, 1958, M.A., University of North Caroline, 1962; Ph.D., 1963

Ward, Kathryn P., Associate Professor, English. B.A., George Washington University, 1935, M.A., 1936, Ph.D., 1947

Warner, Charles R., Associate Professor, Mathematics. B.A., University of Toronto, 1955, B.S., University of Rochester, 1957, Ph.D., 1962.

Warren, J. Benedict, Associate Professor, History. B.A., Duns Scotus College, 1953, M.A., University of New Mexico, 1960, Ph.D., 1963

Warren, Lawrence, Assistent Professor, Dance. B.A., University of California (Los Angeles), 1955, M.A., 1968

Warren, Anne S., Associate Professor, Dance. B.A., Ohio State University, 1966, M.Ed., Wayne State University, 1969

Wasserman, Paul, Professor, College of Library and Information Services. B.B.A., City University of New York (City College), 1948, M.S.L.S., Columbia University, 1949, M.S., 1950, Ph.D., University of Michigan, 1960.

Watts, John M., Jr., Lecturer, Fire Protection Engineering. B.S., University of Maryland, 1966, M.S., University of Massachusetts, 1972

Weaver, Leslie O., Professor, Boteny. B.S.A., Onterio Agricultural College, 1934, Ph.D., Cornell University, 1943

Weaver, V. Phillips, Professor, Easly Childhood Elementary Education. A.B., College of William and Mary, 1951, M.Ed., Pennsylvenie State University, 1956, Ed.D., 1962.

Weber, Joseph, Professor, Physics and Astronomy. B.S., United States Naval Academy, 1940, Ph.D., Catholic University of America, 1951.

Weber, Kurt, Associate Professor Emeritus, English. B.A., Williems College, 1930; B.A., Oxford University, 1932; M.A., Columbia University, 1940.

Wedberg, Desmond P., Professor, Administretion, Supervision and Curriculum, Director, Educational Technology Center. B.A., University of Southern Californie, 1947, M.A., 1948, Ph.D., 1963

Wedding, Presley A., Associate Professor, Civil Engineering. B.S., University of Maryland, 1937, M.S., 1952

Weidner, Jerry R., Associate Professor, Geology. A.B., Miami University (Ohio), 1960; M.S., 1963, Ph.D., Pennsylvania State University, 1968

Weinberg, Donald H., Lecturer, Part-Time, Government and Politics. B.A., Pennsylvenia State University, M.A., George Washington University.

Weiner, Frederick F., Assistant Professor, Hearing and Speech Sciences. B.A., Wayne State University, 1967, M.A., 1968, Ph.D., 1970.

Weiner, Ronald M., Associate Professor, Microbiology. B.S., City University of New York (Brooklyn College), 1964, M.S., Long Island University, 1967; Ph.D., Iowa State University, 1970.

Weinstein, Paul A., Associate Professor, Economics. B.A., College of William and Mary, 1954, M.A., Northwestern University, 1958, Ph.D., 1961

Weiss, Gene S., Associate Professor, Speech and Drametic Art. B.A., Brandeis University, 1961, M.A., New York University, 1965; Ph.D., Ohio State University, 1970

Weiss, Leonard, Professor, Electrical Engineering and Institute for Fluid Dynemics and Applied Mathematics. B.S.E.E., City University of New York (City College), 1956, M.S.E.E., Columbia University, 1959, Ph.D., Johns Hopkins University, 1962.

Welss, Marion W., Lecturer, Pert-Time, Speech and Dramatic Art. B.A., Catholic University of America, 1962; M.A., New York University, 1965

Weiss, Randall D., Assistant Professor, Economics. A.B., Harvard University, 1968, A.M., 1971, Ph.D., 1973

Wellborn, Fred W., Professor Emeritus, History. B.A., Baker University, 1918, M.A., University of Kansas, 1923, Ph.D., University of Wisconsin, 1926

Wellisch, Hans, Assistant Professor, College of Library and Information Services. M.L.S., University of Maryland, 1972

Wentzel, Donat G., Professor, Physics and Astronomy. B.A., University of Chicago, 1954, B.S., 1955, M.S., 1956, Ph.D., 1960

Werbos, Paul J., Assistant Professor, Government and Politics. B.A., Harverd University, 1967, M.Sc., London School of Economics, 1968, S.M., Harverd University, 1969, Ph.D., 1974

Werlinich, Carol A., Lecturer, Part-Time, Family and Community Development. B.S., Pennsylvanie State University, 1961

Weske, J. R., Professor Emeritus, Mechanical Engineering. Dipl. Ing., Hennover Institute of Technology, 1924, M.S., Herverd University, 1931, Sc.D., 1934

West, R. Craig, Assistant Professor, Economics. A.B., University of Missouri, 1969, M.A., Northwestern University, 1971, Ph.D., 1974

Westbrook, Franklin, Assistant Professor Counseling and Personnel Services, Counselor, University Counseling Center. B.S., Chicago State University, 1961, M.S., City College of New York, 1964, Ed.D., Indiana University, 1971

Westerhout, Gart, Professor, Physics and Astronomy. B.S., University of Leiden, 1950, M.S., 1954, Ph.D., 1958

Westhoff, Dennis C., Associate Professor Dairy Science. B.S., University of Georgia, 1966, M.S., North Carolina State University, 1968, Ph.D., 1970

Whalen, Matthew D., Instructor, Part-Time, English. A.B., Fairfield University, 1970, M.A., University of Maryland, 1971

Wheatley, John H., Assistant Professor, Secondary Education and Agriculturel and Extension Education. B.A., Duke University, 1963, M.A.T., 1965, Ph.D., Ohio State University, 1972

Wheaton, Frederick W., Associate Professor Agricultural Engineering. B.S.A.E., Michigan State University, 1964; M.S., 1965; Ph.D., Iowa State University, 1969

Wheelock, Arthur K., Jr., Assistant Professor, Part-Time, Art B.A., Williams College, 1965; Ph.D., Harvard University, 1973

White, Molly F., Lecturer, Secondary Education. B.S., Hollins College, 1946; M.A., University of Oregon, 1951.

Whittemore, E. Reed, Professor, English. B.A., Yale University, 1941

Widhelm, William B., Associate Professor, College of Business and Management. B.E.S., Johns Hopkins University, 1959; M.S.E., 1960; M.S.M.S., 1965; Ph.D., 1969

Wiebenson, Dora L., Professor, School of Architecture. A.B., Vassar College, 1946; B.Arch., Harvard University, 1951; A.M., New York University, 1958; Ph.D., 1964

Wiedel, Joseph W., Associate Professor, Geography. B.A., University of Maryland, 1958; M.A., 1963

Wiggin, Gladys A., Professor, Part-Time, Administration, Supervision and Curriculum. B.S., University of Minnesota, 1929; M.A., 1939; Ph.D., University of Maryland, 1947

Wilbur, June C., Assistant Professor Emerita, Textiles and Consumer Economics. B.S., University of Washington, 1936; M.S., Syracuse University, 1940.

Wiley, Robert C., Professor, Horticulture. B.S., University of Maryland, 1949; M.S., 1950; Ph.D., Oregon State University, 1953.

Wilkenfeld, Jonathan, Associate Professor, Government and Politics. B.S., University of Maryland, 1964; M.A., George Washington University, 1966; Ph.D., Indiana University, 1969

Wilkerson, Thomas D., Research Professor, Institute for Fluid Dynamics and Applied Mathematics. B.S., University of Michigan, 1953; Ph.D., 1962

Wilkes, Joseph A., Lecturer, Part-Time, School of Architecture. B.A., Dartmouth College, 1941; B.Arch., Columbia University, 1949.

Willette, Joanne L., Lecturer, Part-Time, Sociology. B.A., George Washington University, 1968; M.A., 1970.

Williams, Aubrey W., Jr., Professor, Anthropology. B.A., University of North Carolina, 1955; M.A., 1957; Ph.D., University Arizona, 1964

Williams, David L., Associate Professor, Early Childhood Elementary Education. B.S., Bradley University, 1953; M.Ed., University of Illinois (Urbana), 1956; Ed.D., 1964.

Williams, Eleanor, Associate Professor, Food, Nutrition and Institution Administration. B.S., Texas Woman's University, 1945; M.S., Iowa State University, 1947; Ph.D., Cornell University, 1963.

Williams, Mary E., Instructor, Speech and Dramatic Art. B.S., Northwestern University, 1945; M.A., University of Illinois (Urbana), 1955.

Williams, Rhonda C., Instructor, Part-Time, Housing and Applied Design. B.F.A., Boston University, 1962; M.A., Montclair State College, 1968

Williams, Roosevelt J., Assistant Professor, Afro-American Studies. B.A., McGill University, 1968; M.A., 1969; Ph.D., 1974.

Williams, Walter F., Professor, Dairy Science. B.S., University of Missouri, 1952; Ph.D., 1955.

Williams, William H., Assistant Professor, History. A.B., Washington and Lee University, 1956; M.A., Duke University, 1960; Ph.D., 1965.

Willis, William D., Lecturer, Art. B.A., University of South Florida, 1968; M.F.A., 1973.

Wilson, Bruce D., Assistant Professor, Music. B.Mus., University of Michigan, 1960; M.Mus., 1964; Ph.D., 1973

Wilson, Catherine L., Lecturer, Measurement and Statistics. B.A., Marymount Manhattan College, 1972; M.A., Columbia University, 1973.

Wilson, Gayle E., Associate Professor, English. B.A., Wayne State University, 1960; M.A., University of Rochester, 1963; Ph.D., 1965.

Wilson, John W., Professor, Early Childhood Elementary Education. B.A., Bowling Green State University, 1951; M.A., Syracuse University, 1953; Ph.D.,1964

Wilson, Leda A., Associate Professor, Family and Community Development. B.S., Lander College, 1943; M.S., University of Tennessee, 1950; Ed.D., 1954

Wilson, Mark E., Instructor, Music. A.B., University of California (Los Angeles), 1970; M.A., 1972; Ph.D., 1974

Wilson, Robert M., Professor, Early Childhood Elementary Education. B.S., California State College (Pennsylvania), 1950; M.S., University of Pittsburgh, 1956; Ed.D., 1960.

Winger, James H., Visiting Lecturer, Textiles and Consumer Economics. B.S., Carnegie Institute of Technology, 1957

Winkelnkemper, H. E., Assistant Professor, Mathematics. B.A., National University of Mexico, 1963; M.A., Princeton University, 1965; Ph.D., 1970

Winn, Paul N., Jr., Professor, Part-Time, Agricultural Engineering. B.S.A.E., Virginia Polytechnic Institute, 1947; M.S., 1958

Winton, Calhoun, Professor, English. A.B., University of the South (Sewanee), 1948; M.A., Vanderbilt University, 1950; M.A., Princeton University, 1954; Ph.D., 1955

Wirth, Willis W., Visiting Professor, Entomology. B.S., Iowa State University, 1940; M.S., Louisiana State University, 1947; Ph.D., University of California (Berkeley), 1950.

Witczak, Matthew W., Associate Professor, Civil Engineering. B.S., Purdue University, 1962; M.S., 1963; Ph.D., 1970.

Withers, Josephine, Assistant Professor, Art. B.A., Oberlin College, 1960; M.A., Columbia University, 1965; Ph.D., 1971.

Witt, Lois L., Assistant Professor, Dance. A.B., George Washington University, 1960; M.A., American University, 1971.

Wockenfuss, William A., Professor, Mechanical Engineering; Associate Dean, College of Engineering. B.S., University of Maryland, 1949; M.Eng., 1952; Ed.D., University of Florida, 1960

Wolf, Duane C., Assistant Professor, Agronomy. B.S., University of Missouri, 1968; Ph.D., University of California (Riverside), 1973

Wolfe, Peter, Professor, Mathematics. B.S., Saint Lawrence University, 1959; M.S., Northwestern University, 1961; Ph.D., New York University, 1965.

Wolk, Stephen, Associate Professor, Institute for Child Study. B.A., University of Pennsylvania, 1966; M.A., Glassboro State College, 1969; Ph.D., Temple University, 1972

Wolman, Benjamin R., Lecturer, Part-Time, Institute of Criminal Justice and Criminology. B.A., University of Maryland, 1951; J.D., Harvard University, 1956.

Wolvin, Andrew D., Associate Professor, Speech and Dramatic Art. B.S., University of Nebraska, 1962; M.A., 1963; Ph.D., Purdue University, 1968

Wonnacott, Paul, Professor, Economics. B.A., University of Western Ontario, 1955; M.A., Princeton University, 1957; Ph.D., 1959.

Woo, Ching-Hung, Professor, Physics and Astronomy. B.S., Louisiana Technological Institute, 1958; M.S., University of California (Berkeley), 1959; Ph.D., 1962

Wood, Francis E., Associate Professor, Entomology. B.S., University of Missouri, 1958; M.S., 1962; Ph.D., University of Maryland, 1970.

Woodey, Charles E., Instructor, Speech and Dramatic Art. B.S., Towson State College, 1968; M.A., University of Delaware, 1972.

Woolf, Leonard, Professor, Secondary Education. B.S., Johns Hopkins University, 1942; M.Ed., University of Maryland, 1951; Ed.D., 1959.

Woolpert, Stephen B., Lecturer, Government and Politics. B.A., Grinnell College, 1966; M.A., Johns Hopkins University, 1968.

Wootton, Richard D., Instructor, Horticulture. B.S., University of Maryland, 1966; M.S., 1970.

Wrenn, Jerry P., Assistant Professor and Assistant Chairman, Physical Education. B.S., East Carolina College, 1961; M.S., University of Tennessee, 1963; Ph.D., University of Maryland, 1970.

Wright, Charles J., Senior Instructor, Fire Service Extension. B.S., University of Maryland, 1968.

Wright, Diane P., Assistant to the Provost, Division of Behavioral and Social Sciences. B.A., University of Maryland, 1972.

Wright, Emmett L., Assistant Professor, Secondary Education and Agricultural and Extension Education. B.S., University of Kansas, 1963; M.A., Wichita State University, 1968; Ph.D., Pennsylvania State University, 1974

Wright, Howard W., Professor, College of Business and Management. B.S., Temple University, 1937; M.A., State University of Iowa, 1940; Ph.D., 1947.

Wright, Winthrop R., Associate Professor, History. B.A., Swarthmore College, 1958; M.A., University of Pennsylvania, 1960; Ph.D., 1964.

Wu, Carl C., Visiting Assistant Professor, Mechanical Engineering. B.S., National Taiwan University, 1962; Sc.M., Brown University, 1967; Ph.D., 1969.

Wu, C. S., Research Professor, Institute for Fluid Dynamics and Applied Mathematics. B.S.E., National Taiwan University (Taipei), 1954; M.S., Virginia Polytechnic Institute, 1956; Ph.D., Princeton University, 1959

Wylie, Ann G., Assistant Professor, Geology. B.S., Wellesley College, 1966; Ph.D., Columbia University, 1972

Wylie, Margaret V., Instructor, Part-Time, Housing and Applied Design. B.S., University of Maryland, 1972; M.S., 1974

Wysong, John W., Professor, Agricultural and Resource Economics. B.S., Cornell University, 1953; M.S., University of Illinois (Urbana), 1954; Ph.D., Cornell University, 1957

Yaney, George L., Professor, History. B.E., Rensselaer Polytechnic Institute, 1952; M.A., University of Colorado, 1956; Ph.D., Princeton University, 1961

Yang, Grace L., Associate Professor, Mathematics. B.A., National Taiwan University, 1960; M.A., University of California (Berkeley), 1963; Ph.D., 1966

Yang, Jackson C., Professor, Mechanical Engineering. B.S., University of Maryland, 1958; M.A., 1961; Ph.D., 1963

Yarian, Richard A., Instructor, Health Education. B.S., Ball State University, 1971; M.A., 1972

Yeh, K., Visiting Assistant Professor, Textiles and Consumer Economics. B.S., National Taiwan University, 1961; M.S., Tulane University, 1965; Ph.D., University of Georgia, 1970.

Yimenu, Shibabaw, Assistant Professor, Afro-American Studies. B.A., Syracuse University, 1967; M.A., Howard University, 1969; Ph.D., 1973

Yin, L. I., Visiting Professor, Center for Materials Research

Yinkey, Charles B., Lecturer, Part-Time, Housing and Applied Design. B.I.D., Syracuse University, 1974

Yodh, Gaurang B., Professor, Physics and Astronomy. Lecturer, Music. B.Sc., University of Bombay, 1948; M.Sc., University of Chicago, 1951; Ph.D., 1955.

Yorke, James A., Research Professor, Mathematics and Institute for Fluid Dynamics and Applied Mathematics. A.B., Columbia University, 1963; Ph.D., University of Maryland, 1966.

Yoshioka, Gary A., Assistant Professor, Geography. B.S., Lafayette College, 1966; Ph.D., Johns Hopkins University, 1975.

Young, Bobby G., Professor, Microbiology. B.S., Southeast Missouri State College, 1951; Ph.D., Johns Hopkins University, 1965.

Young, Edgar P., Professor and Chairman, Animal Science. B.S., Ohio State University, 1954; M.S., 1956; Ph.D., 1958.

Zajac, Felix E., Associate Professor, Electrical Engineering. B.S., Rensselaer Polytechnic Institute, 1962; M.S., Stanford University, 1965; Ph.D., 1968.

Zaki, Kawthar, Associate Professor, Electrical Engineering. B.S., 1962; M.S., University of California (Berkeley), 1966; Ph.D., 1969.

Zalcman, L. A., Professor, Mathematics. A.B., Dartmouth College, 1964; Ph.D., Massachusetts Institute of Technology, 1968.

Zedek, Mishael, Professor, Mathematics. M.S., Hebrew University of Jerusalem, 1952; Ph.D., Harvard University, 1956.

Zeithaml, Carl P., Lecturer, College of Business and Management. A.B., University of Notre Dame, 1971; M.B.A., University of Florida, 1974

Zelenka, Ionia M., Assistant Professor, Speech and Dramatic Art. B.A., Barat College of Sacred Heart, 1946; M.F.A., Catholic University of America, 1951.

Zelkowitz, Mervin M., Associate Professor, Computer Science. B.S., Rensselaer Polytechnic Institute, 1967; M.S., Cornell University, 1969; Ph.D., 1971.

Zipoy, David M., Associate Professor, Physics and Astronomy. B.S., University of Minnesota, 1954; Ph.D., 1957.

Zeller, William H., Associate Professor, Chemistry. B.S., University of Alaska, 1965; Ph.D., Massachusetts Institute of Technology, 1969

Zorn, Bice S., Associate Professor, Physics and Astronomy. Ph.D., University of Cagliari, 1951.

Zorn, Gus T., Professor, Physics and Astronomy. B.S., Oklahoma State University, 1948; M.S., University of New Mexico, 1953; Ph.D., University of Padua, 1954

Zuckerman, Benjamin M., Associate Professor, Physics and Astronomy. S.B., Massachusetts Institute of Technology, 1963; S.M., 1963; Ph.D., Harvard University, 1968

Zwanzig, Robert W., Research Professor, Institute for Molecular Physics and Institute for Fluid Dynamics and Applied Mathematics. B.S., Polytechnic Institute of Brooklyn, 1948; M.S., University of Southern California, 1950; Ph.D., California Institute of Technology, 1952

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